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THE SCIENCE OF THOUGHT

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PREFACE TO THE REVISED EDITION.

In the successive imprints of this book that have appeared since it was first published in 1869, no changes have been made except the correction of typographical and similar errors. In the present edition several alterations have been made, both in the way of addition and omission. So far as the form is concerned, the book is still in some respects different, perhaps for the better, from what it would be if it were a work freshly prepared by the author. The fundamental principles which it represents appear to me, however, no less true, and more important, than they did when it was first written. I still think that Hegel's analysis of logical forms is the only one which represents their true nature; while the philosophy, if it may be so called, which, in the book, underlies the treatment of the processes of thought, has furnished the lines which my own more serious work has ever since followed.

C. C. EVERETT.

Harvard University, March, 1890.

PREFACE.

It is the aim of this work to consider thought as a reality, to approach it as any work of true science approaches its material. It first discusses the relations that make up the substance of actual thought. It then analyzes thought into its elements, and follows it into its fundamental divisions. It shows the methods of each of these, the kind of argument, and the degree of certainty of which it admits, its dangers and its safeguards, and how all of these divisions are the parts of a common whole. And, finally, it considers thought in its completeness. It seeks to determine its limits and its scope, and to that end it considers some of the actual problems with which thought has to contend, so far as the possibility of their solution depends upon or illustrates the nature and limits of thought itself. Such is at least the plan of the present work; and without regard to the success or failure of its execution, such, I am confident, must be, in general, the plan of any true system of logic; or, if the true meaning and use of this term should be made a matter of dispute, such must be, in general, the plan and scope of any work that shall treat thought as an object of scientific study.

There was never a period when such a study was more important than it is at present, because there was never a time when thought was so wide-spread and so far-reaching. The mind of the people no longer contents itself

with following its old guides. It is feeling its own way. It is seeking, honestly and anxiously, to distinguish the true and the false. Then, too, there was never a time when opposite systems of thought so asserted each its absolute supremacy. Systems of religion, systems of morals, of politics, of philosophy, place themselves over against each other, each denying to the other any ground on which it may stand. Science on the one side, and religion or philosophy on the other, stand thus in antagonism. Nothing is more needed than an attempt to expose the nature and real processes of thought, and while recognizing each of these elements to remand each back to its place as a member of the common whole. Although the survey of this field makes me feel more than ever the imperfection of the present undertaking, it makes me feel, also, that no such attempt, honestly and earnestly made, can be altogether in vain.

I have called this work "The Science of Thought," because its scope is somewhat broader and its analysis of forms less detailed than might be expected in a treatise on Logic. The term Logic is, however, assuming a larger significance than it once possessed. The principles of thought no less than logical forms are receiving profound attention. The scholastic logic did not treat of thought as a reality. It discussed certain abstract relations under which thought is possible. They discuss some of the preliminaries of thought. It is as if a writer on entomology should content himself, first, with showing that each insect must consist of three parts, namely, the head, the thorax, and the abdomen, and then with discussing the manner in which these parts should be related. It could be shown how either might be in the middle; but that there could be a true insect only when the thorax was between the head and the abdomen. I suppose that these matters, and what might be suggested by them, could be

discussed through volumes. The student could be trained to draw fancy pictures of possible insects with the thorax properly in the middle. But whether there was ever a real insect like one of these, or what to call a real insect when he saw it, or what are the shapes and habits of the real insect world, of all this he would know nothing.

This is not a caricature, but an illustration of the connection which logic has been supposed to have with thought. It has been claimed by logicians that they had nothing to do with the reality or the reliability of thought. They have undertaken to furnish help neither in regard to the basis of thoughts and arguments, nor in regard to the proof to be sought in their support. If an argument were formally correct, they, as logicians, could seek no further. I would not dispute the importance of this formal training, but I conceive that it is only the threshold to the real topics with which logic has to do; or, if any would restrict the use of this word, it is certainly only the threshold to the science of thought.

But though in the prosecution of this work thought as a reality became the matter of leading interest, my first attraction to it was from the formal side. First in the lectures of Prof. Gabler, a disciple of Hegel, at Berlin, and afterwards in the works of Hegel himself, I found the rudiments of a system of logic that charmed me by its beauty and simplicity. The logic of Hegel is in general very little like anything that we are in the habit of associating with the name. We should rather call it metaphysics than logic. A few pages are, however, given to "subjective logic;" that is, to what we should call logic itself. These pages of course contain only the most abstract statements in regard to the nature and relations of propositions, syllogisms, etc., but these furnish the germ of an entirely fresh treatment and working of the whole field.

Perhaps the greatest objection to the scholastic logic is not that it undertakes to do so little, but that it does the little that it undertakes so poorly. With its excess of *formalism* it is destitute of form. You inquire, for instance, how many kinds or figures of syllogism there are, and are told that, according to the arrangement adopted, there should be four, but that really there are but three; the fourth being needed to complete the plan, but not otherwise. What is this but a confession that the system of classification is a wrong one; that it misses the real nature of the syllogism; in other words, that it is not natural, but arbitrary. Further, three of these four figures are of comparatively little use except as they may be converted into the first. But in the Hegelian system, there are and can be only three forms or figures of the syllogism. The system of arrangement as well as the facts of the case require this. Moreover, these three are bound together in the closest and most necessary union. Each is needed for the completion of any common argument. Each supports the other, and the three together form a triple cord that cannot be broken. Further, in this system, the syllogism, the proposition, and the term form also the elements of one complete organization; and one principle is the foundation of all.

It was this beautiful and simple arrangement that first made the word *logic* an attractive one to me, and in this work this plan has been adopted.

In the union of these two elements, of substance and form, it has been my aim to attain the *maximum* of form and the *minimum* of formalism. While one principle of division and arrangement has been followed throughout, whatever is merely formal has been, so far as possible, treated in separate sections; and the reader has been often left to apply for himself these formal distinctions, and especially the formal terminology to the material that fol-

lows. It has further been my aim, so far as possible, to dispense with purely technical words. When these could not be avoided they have been kept, as just intimated, so far as possible in the background. In other words, I have endeavored to follow the plan of nature, by which the form is an internal impulse rather than an outward restraint. In accordance with this principle, while each topic has been treated in correspondence with, and in subjection to, the whole, yet each has been treated, so far as possible, as if it stood alone.

I have already stated that the formal arrangement of syllogisms, etc., is adopted from HEGEL. In accordance with this arrangement the relative position of the second and third figure has been reversed. Besides this, an occasional truth or statement has been taken from him. This is especially true of the earlier part of the first book. In the discussion of the logical relations of language, under the head *terms*, I have been very largely indebted to BECKER'S "Organismus der Sprache," a work that is most valuable as giving a logical analysis of language, and to which the reader who would pursue this branch of the study is referred. It is a work, however, that any one, not acquainted with the later philological results, should read with great caution, and only with the accompaniment of some such work as MÜLLER'S "Science of Language," or WHITNEY'S "Lectures on Language." I have, in various parts of this work, made frequent reference to SCHOPENHAUER, the most brilliant of metaphysicians, the clearest and most satisfactory, for the most part, in his details; the most unsatisfactory in his grand results; whose system, with its sad centre of pessimism, is like a rich and tempting fruit, fair without, but rotten at its heart. To this writer I have been indebted perhaps more than to any other, except HEGEL.

The logic of Mr. MILL forms an exception to the general

works upon the subject. It regards logic as having to do with real thought, and not merely with the forms of thought. It is everywhere of value, and in particular in what relates to induction it furnishes material that must be adopted into every discussion of the subject. It is, however, based upon what appears to me a very imperfect system of philosophy, and adopts an unsatisfactory system of logical forms. I make this reference to it here, lest from some incidental allusions to it in the body of the work, where its arguments occurred to me as the best examples of the views I would oppose, I might seem insensible to its great worth.

INTRODUCTION.

THOUGHT AND LOGIC IN GENERAL

THOUGHT AND LOGIC IN GENERAL

THE technical name of the science of thought is logic. The word is derived from an adjective formed from the Greek substantive λόγος. The meaning of this substantive is, on the one side, "reason" or "thought," and on the other side the "word," which is the manifestation of thought. Its central meaning would therefore seem to be, "thought in its manifestation." It is the nature of thought to manifest itself. It is not lifeless like the stone; it is germinant. It cannot be repressed or hidden. Not merely does it develop itself according to the laws of its own nature, that is, as thought; like the sprouting seed, it shows itself above the soil in which it springs. Words and acts are its inevitable expression. Thought runs through all the framework of our outward life, as the nerves run through the body, forming a separate system, yet giving life to all.

We may perhaps better understand the meaning of the word logic, by remembering that the termination which marks the names of many of the separate sciences is derived from the same root as itself. We speak of theology, of geology, and of so many other "ologies." The word logic is the *'logy* without the

limiting or determining prefix. It is the pure science abstracted from the different sciences. It is thus the science of sciences. If the science of stones, of animals, and the like, is important and interesting, what place shall we assign to that science which is the science of thought itself? Any particular science is the reducing or elevating the objects of which it treats to the relations of thought. We can only *see* the stones by the wayside. By the help of mineralogy we think them.

The science of logic includes *the basis* or starting-point, *the laws* and *the limits* of thought. It has to follow the fundamental divisions of thought itself. It has thus to analyze the fundamental ideas from which thought springs, and the special methods that belong to the different divisions of thought. We say, for instance, "Such a picture is beautiful;" "Such plants are poisonous;" "Such an act is noble." Logic should not only furnish the means of determining whether such statements are formally correct, it should also furnish means of determining whether they are actually true; that is, it should have such classifications of thought, that one could tell to which class any one statement belongs, and what is the sort of proof of which that class is susceptible. These divisions, as all other logical forms, should be seen to spring from the very nature of thought itself. These forms should not be "Spanish boots" to torture thought, they should be the very body and limbs of it. There should be one pulse-beat through the whole. Such is the high standard which the present work sets before itself. If it falls short, this will none

the less continue to be the true plan and scope of logic.

The science of sciences does not include of course all sciences and philosophy, but it contains the principle out of which these spring. This is the trunk, they are the branches. At least the knots must mark where the leading divisions of our thought begin.

While logic stands in this relation to the other sciences and to philosophy, it stands in an intermediate relation to psychology. Psychology is like the rest, a science springing from thought, a special application of the laws of thought; but thought is also one faculty of the soul, and thus the science of thought is a part of psychology. The division in all these cases must be a little arbitrary, like all divisions. Who shall say just where the branch of a tree ceases to be the trunk, or how much of crystallography should be included in any general treatise on chemistry? For all practical purposes, however, the lines are sufficiently defined. Individual judgment must determine how far to go in any direction, for the sake of completeness or illustration.

If logic contains the formulas and the fundamental principles of all the sciences, it must also contain those of the facts and objects to which the sciences refer. A science is true only as it hits upon and follows out the actual relations of the materials which come within its cognizance. The principles of the science, if it be true, must be one with the principles of its material. The two must cover each other. The artificial system of botany was imperfect, because its divisions did not fall in with the divisions of nature.

The natural system claims to follow and to cover the actual divisions in the outer world. What is true of the principles of any science must be true of the principles of thought. The principles of thought must be the principles of that which is the object of thought. Logic unites the inner subjective world with the outer world of objects. It is the boundary line between the two; that being so, it belongs equally to both, and its fundamental categories must be those of being as well as of thought.

We may go a step further. It has already been said that outer objects must be transmuted into thought before we can comprehend them. What change is this which they undergo? If the thought is something utterly foreign to them, then we might as well have any other thought, or no thought about them. In that case our thought is idle and useless. If, however, the thought is true, then it cannot be foreign to the object of thought. The thought must be what the object is in itself. If this is so, the object in itself must be thought. This statement may seem a little startling at first sight. If we say the outer world is objective thought, while what we call thought is only subjective thought, and thus the two are at heart one, a person who hears this for the first time may be confused. Yet we have just seen, that, obviously, if our thought be worth anything, the thought and the object must be at heart one. The phrase objective thought is not after all so difficult as it may at first appear. Erwin von Steinbach thought out a cathedral. The builders of Strasbourg embodied his thought in stone. What, then, is the cathedral at

Strasbourg, but the thought of Erwin von Steinbach made outer or objective to himself? We may approach this structure simply as objective thought. When we strive to comprehend it, we strive after the thought, which is its reality. When we do comprehend it, we have got hold of its place and object; that is, of the thought which is its reality. We might apply the same course of reasoning to the steam engine, or to any other work of human skill. Each is an objective thought. We look at it, and study to get hold of the thought that is in it. The same process we apply also to the objects of the natural world. We find these, also, when we approach them aright, unfolding themselves, and becoming thought. We may illustrate this by saying that the world is the thought of God made objective. When we study and analyze the world, we trace the unfolding of this thought.

But it may be very properly urged that this illustration goes only a very little way. The world may be, or may be supposed to be, the thought of God; but whose thought can we suppose God himself to be? To this may be answered that if God is omniscient he must know, that is, must think, his own being. His own being must be absolutely an object of thought, that is, this also must be objective thought.

When, then, it is said that all being is simply objective thought, it is meant that all being exists to the infinite mind as thought, and that all being may exist to any mind as thought, so far as this mind is developed enough to grasp it; the limit in every case

being not the nature of the outward object, but the capacity of the mind itself.

It may be further remarked that this discussion does not enter into the metaphysics of thought itself. If *thought* and *will* are, as I may here assume them to be, the two poles of being, they must, through this polarity, be in essence one.

The common thought of man assumes this correspondence, or identity, between thought and being. If a common man have the notion of cause and effect, if he cannot think without assuming this notion to be true, he does not hesitate to take it for granted that cause and effect are in reality what he thinks them to be. To doubt in such a case would be to give up all reality to thought. We might as well dream as think. The man of culture, on the other hand, finds often a gulf separating the world of thought from the world of being. His thought seems to him unreal, and he cannot get hold of true being. He makes perhaps some concession; he says, "These thoughts come and go without any will of mine; they form in themselves an organic system, which I cannot disarrange or remodel; they are, then, in a sense, objective to myself. They must have some cause external to my own mind. What this is I do not and cannot know. Whether it has, or not, any resemblance to my thought of it, is a question that can never be answered. True being I can never find." But the difficulty is one the thinker himself has originated. He cannot find true being? What, then, is his thought itself? Is not that real? Whatever else is, or is not, that is. His thought forms a world in itself. It is the only world

he knows anything about. Whether anything else has or has not being is a question that is grasped entirely out of the air. He has no conception of anything else. When he has such a conception, he may discuss its reality. But then that conception will be itself a thought. A single example may show the result which springs from this simple and common-sense affirmation of the reality of our thought. Metaphysicians have discussed the question whether time, that is, the succession which gives rise to the conception of time, has any real existence. Yet our thoughts are real. They succeed one another according to the relations of time, and thus these relations are real.

But, it is urged, the thing in itself must be something very different from our thought of it. The thing in itself is a cold and shadowy ghost, that haunted the philosophy of Kant, as it has haunted so many others. The fact is, we have a real world without it. It is a phantom standing outside of the great forces of the world, or, rather, thought incorporates it into our world. We may go further, and say that there is no such thing as the thing in itself. Everything exists in the relations in which it stands to the things about it. Existence is no lifeless abstraction; it is the throb of action and reaction. Apart from this, a thing is annihilated. And it is these relations which are the objects of thought, and which resolve themselves into the relations of thought. It may be urged still further that after all that is *thought* has been extracted from the outer world, there must be a residuum that is not, and cannot be, thought; that is the material that forms the basis of

the world of objective thought. In a word, matter must always be the antithesis of thought. But what is more truly an object of thought, or what is more truly the creation of thought, than the abstraction that we call matter?

But the statement of the identity of the subjective and the objective world becomes false if we take it too literally.

There is a sense in which water, ice, and vapor are the same; yet they are very different. Water is not ice, neither is it vapor, though it is potentially both. The abstract chemical formula is the same for all. Water, ice, and vapor is each H_2O. So it is with thought and the outer reality in their relations to one another. Neither is the other, yet each is at heart what the other is, and the formula for one is the formula for the other. This formula, common to both, it is the business of logic to express.

All that has been said above is simply an elaboration of what is contained in the simple faith in which we think. If it is not true, all thought is simply an escape from the tedium of vacuity. Objections to the ground taken may be brought from two sources. One of the sources is thought itself; the other is the imagination. When thought begins to plead against the reliability of thought, we may be pardoned if we give it little attention. All that has been said has been based on the reliability of thought. Suppose thought prove thought to be false, what remains? Thought. For my thought to question the reliability of thought in general is to set the individual against the universal, from which it springs.

The other source from which objections may spring is the imagination. In the statement that thought and the outer world are at heart one, there seems nothing for the imagination to lay hold of. It has not been used to represent thought to itself, otherwise than as the thought of some particular person, my thought or yours. Against the objection of the imagination the only reply is, that the imagination has here nothing to do. When we discuss the absolute relations of being, the imagination must remain silent, content only with such fragments as the reason may be able to throw to it. Much of our false conception and false reasoning results from the feeling that the imagination must be consulted and satisfied. The mathematician has had the courage to banish it or reduce it to quiet. He follows the course of his symbols, treading airy heights where the imagination would become dizzy, and from which she would hold him back. The philosopher has to tread far more dizzy heights than those of the mathematician. He, however, too often takes the imagination as his companion. She, appalled and dizzy with the wastes about and beneath them, conjures up many-colored and fantastic clouds. Among these the reason wanders confusedly, studying them and sketching them as if they were realities. Thus has it so often wandered in vain, if it has not indeed lost itself and perished.

The position which we have taken is thus free from the possibility of assault. From it result two conclusions, each of the utmost value to the student of thought. The first is, that the categories of thought and of being, of the inner and the outer world, are

the same. The second is, that there is no absolute limit to thought, but that for it the unattainable is the untrue.

It need hardly be remarked, that all this is true, not of my thought or yours, but of thought itself. The special problem for each individual is to make his thought fall in with, and express, so far as it goes, the absolute thought. We will pass then, now, from the general to the individual stand-point.

The line where the individual comes into direct contact with the outer world is that of the senses. What has been said in regard to the reliability of thought does not necessarily involve that of the senses, in their simple and crude reports. The apprehension of the unthinking is, that things exist exactly as they appear to do; that the table actually stands as they see it before them, with its crimson cloth; that the flowers are many-colored and fragrant; that the lamp actually emits light; that sounds are actually produced from the piano. A slight analysis, however, shows that all these colors and scents and sounds are mere sensations, and can be reproduced separately without the aid of the corresponding outward object. Thus the sensation of color is often produced by mechanical pressure upon the eye. If you look earnestly at one bright color, and then turn away from it, or close the eye, an entirely different color will be seen. The sensation of light may be produced by a blow. The school-boy can testify of the stars that he sees when the back of his head comes in contact with the ice. Perfect figures may appear before the mind when there is no outward ob-

ject answering to them. Such are the visions which present themselves to us in our dreams, or as the result of disordered sensational action. The sensation of sound may also be excited without external cause. One may have a ringing in his ears, when there is no ringing to be heard by any one else in his neighborhood.

This analysis need not be continued further. From it, it would appear that the world flashes into beauty when our glance falls upon it; that the brook begins its rippling song and the cataract takes up its mighty music when we approach them; but that without the presence of the eye and the ear nature is blank and voiceless. If one, pressed by such reasoning, affirms that he knows that the world exists as he sees it, because of the resistance which he feels when he comes in contact with any part of it, as when he strikes his hand against a wall, the answer is, that what we call the hand, like everything else, may be analyzed into sensations. It and the wall stand in the same relation, and each has equal need of verification.

The first remark to be made in respect to such reasoning is, that our sensations are as independent of us as our thoughts. The causes of the sensations are independent of us. We can indeed move the hand and the whole body. We thus distinguish our body as peculiarly ours. Yet we cannot change it by our will. We cannot make one hair white or black, or add a cubit to our stature by an act of will. The world of the senses is therefore as independent of us as the world of thought. We are forced by the instinct of our nature to believe in it. We do not

necessarily believe that it exists in the crass form in which the senses picture it to us, or in the yet more crass form of matter, which is a lifeless abstraction of our own; but we cannot help believing that it has in some way a real existence.

The instinct which forces us to this belief divides itself into two forms. The first of these forms of instinct we may call negative. It is that of self-preservation. We shrink from any object which seems to approach us with violence. We flee from the track of an approaching locomotive. We feel that if we did not do this our animal nature would be annihilated. Such safeguard is needed in one form or other, and, to a greater or less extent, every moment. So dear as life is to us then, we must believe in the world of the senses.

The other form of this instinct of belief we may call positive. It is the instinct of the activity and the development of our whole nature. The moral law within us is the highest form which the instinct assumes. This moral law requires us to believe in the world of the senses; otherwise it would have no field for its activity. This law we feel to be the central point of our being. This impels us to go forth into the world, to bring relief to the suffering, and justice to the wronged, to throw ourselves into the path of evil, and to make the world such as we feel it should be. Our æsthetic nature, and indeed all the active part of our nature, forces us to the same result.

From the analysis of the elements of the instinct of belief in the world of the senses, we may under-

stand the emptiness and the lack of reality which the world acquires for those who are placed by their fortunes in circumstances in which the instincts of self-preservation are not called into action, in which there is no need to labor for the daily bread, and in whom the moral sense has not been quickened or has become dead. The two elements which make up the instincts of belief lose thus their tone and vigor, and the world becomes, as the result, shadowy and unreal.

Whatever confidence we may put in these instincts, and in their general testimony, they are, we must confess, no certain guide in regard to the truth of particular perceptions. In our dreams we strive to flee from danger, or to defend ourselves from it. The man who is suffering from an attack of delirium tremens is affected by the objects that haunt him as if they were real. He flees from pursuing serpents, or turns to struggle with them, and is wild with terror. Thus even the instinct of belief in its strongest form, as the instinct of self-preservation, is no certain guide as to the truth of particular perceptions. What means have we more competent to decide?

Before answering this question, it must be admitted that the force of our impressions may be at any moment so strong that, however false they may be, no power can make us doubt their truth. The victim of delirium tremens is absolutely under the power of his delusion. No reasoning of his own, and no protestation of friends, can make him doubt that he is really pursued by serpents. Yet when the mind is

in a healthy state, we often can and do distinguish between false and true impressions of the senses. We distinguish the ringing in our ears from any outward sound. We often know by a feeling of chilliness that we have taken cold; that is, we know that the chill is within us, not outside of us. A person subject to ocular illusions can very often distinguish between these and the solid objects about him. This is sometimes difficult, however. If one, for instance, has a vivid impression of the visible presence of some departed friend, it is often difficult for him to determine whether what he has seen is the result of a play of the senses, or whether it is in truth a vision from the spiritual world. If the forefinger and the middle finger be crossed, and some small object, as a pea, be placed between the tips, the impression upon the sense will be, for obvious physiological reasons, that two objects are in contact with the fingers; yet we have no difficulty in determining that there is only one. We more often decide against the reality of past than of present impressions. A dream may affect us with as much power as a reality; yet when we look back we have no difficulty in determining what was dream and what was reality.

The appeal in such cases is to thought. Indeed, it is by thought, unconscious it may be, that we determine every moment the truth of the testimony of the senses. Something is accomplished by comparing the testimony of the senses among themselves. Something, also, by comparing the impressions of others with our own. In general, however, we have to compare the results and impressions of the senses

with the fundamental principles of thought. We inquire whether the world which the senses give us can possibly be identical with the world of thought.

My thought assumes that all change takes place in accordance with certain relations which we call those of cause and effect. These relations form a chain by which the course of events is bound together. It matters not for our present purpose whether these relations are discerned by *a posteriori* reasoning, or whether they are the original forms furnished by the mind itself. This last is the position of Kant, and he urges that we cannot have gained the knowledge of cause and effect from the outward world, because it is by the presence or absence of these relations that we distinguish the outer world, and without them we could have no knowledge of it. It is enough for our present purpose that these relations are inseparable from our thought as it exists, and that it is by means of them that we recognize the reality and truth of the world which the senses offer to us. When this chain of cause and effect is broken, then our confidence is lost. We believe that the outer reality of our impressions stops when the chain is broken. I look back, for instance, to what has happened to me within a few hours. I remember going to my place of business, or, perhaps, on a ramble with a friend. Afterwards I came home to tea. When tea was over I went to my room, lighted my gas, read Plato or Shakespeare, then extinguished my light, and stretched myself upon my bed. The next thing I know is, that I am wandering in scenes of Oriental beauty, riding on the same camel

with the Grand Turk, or sailing over broad seas beneath the clear blue heavens, or, perhaps, conversing with friends that before had been leagues away. Then I find myself in my bed again, not wearied by my camel-ride or my voyage. My friends are as far away as ever. I rise and go about the regular duties of the day.

In looking back upon all this, I see one point where the chain of cause and effect was suddenly broken. After that break, I wander through scenes connected with one another, or utterly distinct from one another, all of them unconnected with those that had preceded the break in the chain of cause and effect. At last I come to a spot where the links of the chain unite with those that had been broken, and things are bound together again in the original series. I distinguish thus in my memory between what is reality and what is a dream. All seemed equally real at the time of its occurrence, but only those impressions which are strung together on the thread of cause and effect are recognized by our afterthought as real, while those introduced between these seem to be mere dreams and fancies.

When things in general are connected by cause and effect, but something unusual happens which seems entirely unconnected with the series, we, in general, admit it to be real, because the regularity of other things persuades us that we are in the full possession of our senses. Indeed it is in this manner that we decide upon the reality of a hundred things in a day, for the presence of which we can give no reason. But when all the events of our life take

a sudden turn; when we find ourselves embarked on some unexpected journey; when friends are suddenly removed from us, or our life seems in any way disconnected from its previous course, — we say often that we feel as if we were in a dream. We have to look back and see how our present state grew out of our former condition. In like manner a phenomenon may appear to us so remarkable that the utmost regularity in other matters will hardly convince us that we are not deceived. Here we need the evidence of others, and still more the repeated evidence of our own senses. We read of men who, in like circumstances, have pinched themselves to see if they were awake; that is, to see whether so slight a cause as a pinch will produce its customary effect, namely, the pain. The appeal in all these cases is to *thought*, that is, to the relation of cause and effect, elsewhere maintained, which proves to us that we are still connected with the world of reality.

Although we may thus, by the aid of thought, admit the outward reality of any phenomenon, the cause and general relations of which are unknown to us, on account of the regularity of the phenomena by which it is surrounded, just as a man is judged by his company, yet we do not rest with this. We do not admit that we *know* any fact or phenomenon till we have reduced it to the laws of thought. If the astronomer sees a strange star in the heavens, he is not content till he finds whence it comes and whither it is going. The man of science does not *know* any object till he has brought it into his system of the universe. We see, for instance, a muscle in the

human body. It strikes us as a mere phenomenon, which might be there, or might not. But when we see it, in its connection with the rest; when we see the regular part that it plays in the bodily system, perhaps to enable us to raise a limb, perhaps only to bring a dimple to the cheek; when we see that it is the analogon of the corresponding organ in the lower animals, perhaps, like the motor muscles of the ear, only existing as a trace of this lower organization; when we examine its structure, and see how this is adapted to its purpose, the provisions that are made for its support and excitation; when we see how it destroys itself by its action, and repairs itself from that which is akin to it in the blood, and which had been first eliminated from the food; when, in a word, we have reduced it to thought, so that we have before us no longer a mere object of the senses, but an object of thought, or, more accurately, a complex thought, — then first we feel that we know it; then, indeed, does it first become real to us.

Not only do we analyze an object of sensation into thought, we often by thought change its whole apparent nature, and contradict the senses by means of the very material which the senses have given us. If our senses inform us of anything, it is that the sun rises and sets. This is at first implicitly believed by us. Afterwards we find that it is impossible. The sun, so far as its rising and setting are concerned, does not move. It is we that move, and thus the testimony of the senses is proved to be false. I know that it will be said that our senses utter the truth in this case; that it is our inductions from this

that are in the wrong; that our sensations are just what they should be, the circumstances being what they are. This is freely admitted; yet the object which we place beneath and behind our sensations in this case is no more the result of induction than it is in all cases. What we call an object of sense is, in all cases, our induction from our sensations. The man who scorns thought, and trusts to his senses, really trusts to his induction from them, that is, to his thought about what the senses affirm. Reasoning only substitutes clear, thorough, and complete thought, in the place of that which is imperfect and confused.

It often happens that thought afterwards restores to the world of the senses that of which it at first robbed it. Thought is very apt to be first destructive, and then constructive. We have already seen how the first serious thought seems to take its life and beauty out of the world of the senses. Color, form, sound, fragrance, beauty, melody, — all these seem to depend upon human presence. The beauty of nature seems an obsequious slave that springs into action when our glance falls upon it, and sinks back into indifference when we turn away. More perfect thought, however, reaching the conception of the *Infinite Subject*, the divine consciousness everywhere present, restores to nature more than it took from her. There is always present this higher consciousness of God, to which no life or beauty is lost. The world is always fresh and fair, let us come and go as we will.

We have thus seen how universal is the world of

thought. We have seen that it is real, and the only reality, and that in it we live and move and have our being. We see, then, that no study comes more near to us than the study of the laws and relations of thought. When we first enter the world of thought these relations seem utterly confused and entangled. Men think everything and about everything. One man thinks one thing and another another. Childhood, manhood, and age has each its thoughts. The thoughts of one generation are not those of another. All is confused, as when we look at the crowd of bees that seem huddled together in a hive, or the crowd of ants swarming about their little hill. But as when we look at the bees long enough and wisely enough, we distinguish the work and the place of each; as by proper observation we discern that the ants do not move perfectly at random, but that each has its work, and the work of all is in reality the same: so when we study these crowding, hurrying, swarming thoughts, long enough, we see that they, also, have their order and their system. We shortly detect two distinct lines of movement, which, without more minute analysis, we may accept at present. We see that thought moves either from the more general towards the particular and individual, or else from the latter to the former. The separate impressions of the senses, which are the extremes of individualization, we seek to lead to higher and higher generalization. The instinct of generalization and induction is one stamped deeply on the soul. From this tendency have sprung all the natural sciences. We ever seek a higher law in which all others shall find themselves absorbed; a

broader fact which shall include all that we have known before. On the other hand, no abstract thought is content to remain in its abstraction. It will develop itself into the most minute subdivisions of which it is capable, and it will find itself embodied in outward facts. This twofold motion, downward from the universal towards the particular and the individual, and upward from the individual towards the universal, constitute the life and being of thought. It is to discover the manner in which the universal, the particular, and the individual find themselves related, and the movement by which one passes into another, that is the object and the substance of logic.

The most universal terms, which express in brief the relations within which all existence is confined, and which furnish thus the form and the material of our thought, are called categories. If what has been said of the relation of thought and being is true, these must in their last analysis correspond with the relations of thought itself. In entering upon the study of thought as a reality, we must first take account of these.

FIRST BOOK.

ABSTRACT MATERIAL

AND

RELATIONS OF THOUGHT;

OR,

CATEGORIES.

FIRST.—POSITIVE.

STATIC RELATIONS.

A. — QUALITY.

When we seek for the idea which is the most universal, or for the fact that includes all others, we come upon the idea and the fact of being. This is not absolutely universal either in thought or in fact. It is already discriminated from non-being or nothing. When we say that a thing *is*, or that God *is*, we exclude the possibility of the nonentity of that in regard to which we affirm that it is. When a thing comes into being, it ceases to be nothing. Being is thus affirmation over against non-being. We have, however, no thought, and thus no word, which includes all that is and all that is not. Thought demands limit. It is the limitation of the universal, or the expanding of the limited into the universal. Our thought begins with the separation between being and non-being.

Because thought consists in entering into, or passing out of limitations; because, also, existence is limitation upon limitation, — pure being, unlimited and undetermined, is hardly different from non-being. If we say simply *is*, we say nothing. Every other

word which is not merely formal says something by itself. You may say *walk* or *run*, *black* or *white*. Each word means something by itself, to any one who is used to and comprehends it. But if you say *is*, what meaning can any one attach to that? If you say God is —, to one who attaches no meaning to the word God, the answer would be, *God is, very well, what is he?* When you say *is*, you say nothing, till you say what is, and what it is. You might as well say *is not*, as *is*. Thus pure, absolute, undivided being would be no thing, because it is not as yet subjected to the limitations by which it becomes something. Pure, unbroken light is indistinguishable from darkness. If the universe were full of light, with no object to break up this light into color, you might as well say that the universe is dark as that it is light. There is indeed this difference, that in the one case there is the possibility of color, and thus of light, and in the other there is not this possibility. But thus far this difference is merely potential. What the senses mean by light has no existence.

Things exist in their qualities, and all quality results from limitation. A thing is what it is, on account of what it is not. Red is red because the green rays have been absorbed, or in some way stricken out from the ray of light. Color is the union of light and darkness; that is, of light and the absence of light. Thus everything is what it is through what it is not. As color is a union of light and darkness, so quality in general is a mingling of being and non-being; that is, it is partial being. This fact lies at the very threshold of metaphysical thought.

All qualities are limited, because each is only the partial expression or manifestation of the object, the quality of which it is. The object, so to speak, breaks itself up into these qualities, as light breaks itself up into colors. No one quality represents the unit of being which is the object of which it is one of the qualities. The qualities of finite objects are doubly limited, because it is owing to the finiteness of the object that it has these particular qualities and no others.

When it is said that quality is limitation and exclusion, it must not be understood that thus it is merely negative. The color of red is not merely the absence of green, it is light, though light destitute of the green rays. So all quality has a positive reality although this reality is partial. Neither must it be supposed that this negation is anything imposed upon the body from without. The negative element is as much a part of its existence as the positive. The quality, if we may use the expression, separates itself from its opposite. Thus colors and sounds separate themselves by their own laws.

Qualities often appear to us merely *different* from one another. Walking, running, leaping, are each special methods of motion. The qualities of each motion distinguish it from other forms of motion, and specialize it out of abstract motion. These qualities have no particular relation to one another, so far as we can discern. Other qualities differ as mere positive and negative; that is, one is the mere absence of the other. Thus, good and bad, light and dark, differ merely as presence and absence. But from the defi-

nition of quality, it will be obvious that this relation must often be more special and direct. If qualities result from limitation, and thus from division, one quality being one side of the line, and another the other, there must be two qualities which are complemental to each other; that is they result from the division of a unit which is reformed by their union. Of these complemental qualities we find an example in the colors red and green, already so often referred to. This relation we may even call polar; but we do this not with perfect propriety. Qualities which are polar stand in a more intimate relation to one another, one having no possible or conceivable existence without the other. Thus the positive and negative electricity are distinguished by their peculiar qualities, yet neither can exist without the other. We thus see that elements which are the most sharply divided are the most intimately connected. Those that are merely different from one another may exist independently; but when the difference has become polar, we know that the elements must be at heart one, each having its being in the other. We might expect, from what was said above, that complimentary qualities would be as inseparable as those that stand in a polar relation to one another. We might expect that, if they are the result of the division of a unit, both of the separated elements must remain; and there could be, for instance, no green without red, and no red without green. In the case of a color, as green, however, the energy that would have manifested itself as red may put on another form. An object is green, because, while the green rays are

reflected, the red have been absorbed or exist no more as red but are transformed into some other kind of activity.

The quality of an object may be defined as that which cannot be changed without change in the structure or nature of the object. The object changes with its qualities. When we say that an object is changed, we mean that its qualities have become different. Some qualities involve in their transformation a fundamental and radical revolution in the object. We speak of the lion as carnivorous. Should the time ever come when the lion shall eat straw like the ox, his whole organization would be changed. Teeth, claws, digestive apparatus, and indeed the whole structure and economy of the animal would be transformed. Other qualities demand for their mutation less general disturbance. Of these, color is, perhaps, the most superficial. The mineralogist, for instance, to a very great degree disregards color in his classification. Color is not essential in the stone. Yet the color of a stone implies the presence or the absence of some ingredient which extends through all the particles of its composition. So in all cases a change in color involves some change, however slight, in structure or composition.

Different objects may have similar qualities. We generalize this similarity, and reach the conception of a quality common to all these objects. The quality extends beyond one object, and we may sum up all that possess it under the quality which they have in common. Many objects are red; many animals are carnivorous. The whole world is divided by the words organic and inorganic. Life, motion, rest,

may be affirmed of multitudes of objects that differ in almost all other respects. Thus, a quality may be considered as a universal, and the objects possessing the quality as individuals under this universal.

A moment's thought will show us, however, that we might take a diametrically opposite view. Each object has not one quality but many. All of these are its broken manifestation. Each partially represents it. We may, therefore, regard the object as the universal, and the qualities as particulars and individuals under it. Moreover, we may sum up the units of being, which are the objects, under some generalization that shall include them in their wholeness without breaking them up into qualities. We thus leave out from our thoughts the qualities of objects, and consider them as independent of these. But matter abstracted from quality exists merely as quantity.

B. — QUANTITY.

Quality has been defined to be that which cannot be changed in a body, without change in the structure or composition of the body. Quantity is that in which a body may be changed without any change in its structure and composition, and thus in its quality. This definition, however, includes too much; for rest and motion and other outward relations imply possibility of change without change of quality. It does not include enough; for a quality itself admits of change that is quantitative and not qualitative. We may then give, as a final definition of quantity, the following: Quantity is that to the per

manence or the changes of which quality and the relations of space are indifferent. This definition includes all and no more than is involved in the conception of quantity, while, at the same time, it avoids the tautology of the common definition, which speaks of increase and diminution, which already involve the idea of quantity.

Quantity may be extensive or intensive. A stone may be larger or smaller. This involves the idea of extensive quantity. Red may be more or less intense, and it is still red. This is intensive quantity.

Extensive quantity may be continuous or discrete. The possibility of extensive quantity we call space.

From the definitions above given, it is obvious that quantity is not merely quantitative, but that it is qualitative also; that is, it has itself qualities. The difference of intensive and extensive, of continuous and discrete, are differences of quality. These qualitative distinctions are found in the whole extent of quantitative relations. Continuous quantity and discrete quantity, each involves certain necessary relations which form the qualities of each. The qualities of continuous quantity form the basis of geometry; those of discrete quantity form the basis of arithmetic and algebra; that is, of number. When we speak of the extent, or the size of any object, we regard it as continuous. If it has separate parts, if it is composed of atoms, we overlook them. We regard simply the space occupied by the body. When we speak of the number of any bodies, we regard them as discrete. When we apply the distinctions of arith-

metic to chemistry, we regard the bodies under consideration as made up of atoms, each distinct in itself. According to the atomic theory in its full extent, the molecules of a body do not touch each other. Thus, according to this theory, there could be no continuous quantity, except in the separate molecules themselves, and in abstract space. Space itself we may consider as made up of points, but we recognize this as a mere help to the imagination, since these points cannot be separated. The same is true of the fictions by which a solid is supposed to be made up of planes, or the circumference of a circle to be made up of straight lines. All of these cases change continuous into discrete quantity, because the relations of the latter are so much more easily handled than those of the former. We must not, however, allow ourselves to be deceived and misled by such practical methods into theoretical error. Quantity is both continuous and discrete. Neither element can exist by itself. Continuous quantity consists of points. Yet these points fill all the space, and are themselves perfectly alike. Each is what the other is; and thus they are continuous. The point has no existence by itself, merely as an abstract point; neither has continuous quantity an existence without points. The famous paradoxes of the Eleatics, by which they sought to prove that there could be no motion, were founded upon the fallacy of supposing that either continuous or discrete quantity could exist by itself. Thus it was said, when a body moves through a certain space it is for an infinitely minute period of time in every point of the space through which it moved. This

being so, it was argued that it was at rest at every one of these points, and if it rested at every point, it was all rest and there could be no motion. We cannot thus sever the two elements of quantity. It is both discrete and continuous. It is made up of points, yet it is an unbroken whole. Such reasoning upon continuous motion, as if it were made up of successive rests, however infinitesimal, is as if the geometrician should take in serious earnest the occasionally convenient assumption, that the circle is a polygon with infinitesimal sides.

Quantity, as we have seen, is independent of all qualities save its own, and these it carries wherever it goes. We found that quality was imperfect as a universal, because it might be considered as subordinate to the unit of being of the object, one of whose qualities it is. We therefore turned from quality to that unit of being, which is one form of quantity. When we sum up objects as units, we sum up all that they are. But quantity took us faithfully at our word. The qualities that we gave up are lost to us. Quantity is more abstract even than quality. Take a thing as a unit, and you regard nothing more in it. A unit is a unit, and all units are alike. Let it be pebbles or worlds, each is a unit; each is one.

$$5 + 3 = 8,$$

whether we are considering men, nations, or straws. We find a like abstractness in continuous quantity. It measures the space occupied by an object, not the object itself. It is utterly empty and unreal.

This indifference of quantity has, however, its limit.

As quantities change we meet, here and there, points, where change in quantity becomes change in quality. It is the last straw, says the proverb, that breaks the camel's back. As addition after addition is made, however slight and gradual these may be, a point is at last reached, where the load which was at first hardly perceptible becomes a crushing weight.

C. — LIMIT.

We reach thus the knowledge, that the indifference of quality to quantity has limits beyond which it does not exist. Quantity and quality thus strike into one another. To everything there is placed a limit, within which it is confined. If it passes this limit, it ceases to be what it was. The higher the organization of a body, the more it is subjected to the law of limit. The worlds, the mere rude material bodies which are scattered through space, are of all sizes from the meteor to the suns. Yet even here quantity makes a difference in quality. The condition of the different worlds at any given time appears to depend upon their size, more than upon any other circumstance with which we are familiar. All originally being fiery and molten masses, the rate of their cooling depends upon their bulk. One, like the moon, is cold and lifeless, without moisture or inhabitant. Another, like Jupiter, is still a watery mass unfit for habitation. Another is a mass of fire; while others still have reached and not passed the temperate period suitable for habitation. What other causes may be at work we do not now know. Whether the heat of

the sun is, according to the ingenious theory of Mayer, kept up by meteoric blows, as the iron may be kept hot by the hammer, has not yet been determined. Still the fact remains in general true, that the present condition of each world is dependent upon its size. The mineral elements of the earth are less directly dependent upon their quantity for their quality. A stone may be any size, and yet the same, although there is in many respects a difference between a grain of sand, a rock, and a mountain. In water this is more marked. The difference between the ocean with its tidal flow, and all else that mark it for what it is, and a pool by the roadside, is a difference of size. The higher organic forms are held more sternly to the law of limit. Man and all the higher animals have limits which they cannot pass. What goes beyond these by any chance, we call monstrous, and feel for it either horror or disgust. It is worthy of remark, however, that this limit is much more fixed at present than it was in the geologic epochs. Then animal life, and especially reptile life, seemed to be subjected to no law or restraint of bulk. One element of the awe, if not the horror, which we feel, as we contemplate the swarming monsters of the mesozoic period, is this lawlessness, this absence of limit. The classes of existence seemed to run together. Bird, beast, and reptile seemed to flow into one another, while all grew together, apparently to such bulk as chance might suggest. Here were doubtless law and limit, but these were so different from anything which we know as such, that we do not recognize them without careful and prolonged study,

and then only partially. The dread which many feel of any theory of development results from this, that the law and limit which rules the world seems by it to be done away.

In social organizations we find the law of limit asserting itself. A town, as it varies in size from a frontier settlement to a mighty city, changes its nature, as the Tityrus of Virgil discovered to his wonder, more even than it changes its size. The political organization, the architecture, the furniture, the customs of society, these and innumerable other elements, change by a certain necessity with the growth of a town, so that one hardly knows, in the contemplation of London or New York, whether he is more struck by the extent of streets and houses, or by the appearance of a single street. Broadway is more New York, the boulevards are more Paris, than the extent and the mass of buildings and population that surround them. But yet Broadway and the boulevards grew out of this mass, and are its exponent. We find the same principle in smaller structures and organizations. The rig of a vessel varies with its size. One is a sloop, another a brig, another a ship, with varying limits to be sure, but in general according to its tonnage. In a word, this principle runs through civilized life.

In qualities the law of limit is no less marked. Here we see more clearly manifested the tendency, not merely to a change, but to an absolute transformation and inversion, in passing the limitation line. A quality tends to become its *opposite* when it passes beyond its limit; that is, its *generic character* thus

changes, even when its formal individuality remains the same. Thus a virtue overdriven becomes a vice Generosity passes the limiting line and becomes prodigality. Economy becomes avarice. Zeal becomes bigotry. Playfulness becomes emptiness. It is in this way, by the transformation of qualities and their effects, that extremes meet. The miser often feels more of the evils of poverty than the beggar to whom he refuses a pittance. The mere pleasure-seeker is the most melancholy being in existence. What is through its novelty a joy, becomes through repetition commonplace and wearisome. The means of enjoyment, and the capacities for enjoyment, tend to reach their limit together. A punctilious legality may pass into Pharisaic pride, and sin itself may, through repentance excited by the very enormity of its sinfulness, become virtue.

> "Pride ruined the angels;
> Their shame them restores;
> And the joy that is sweetest
> Lurks in stings of remorse."

This tendency is indeed the saving, if not the moving, power of history. Tyranny thus works for democracy, and democracy, when it degenerates into a mob, assumes some law, even if it be that of an empire. The Spartans used to send a drunkard through the streets as a teacher of temperance. In this way vice itself becomes the minister and the handmaid of virtue. In a word, this tendency is the basis of the great law of compensation, according to which self-sacrifice becomes its own reward; of the great law of retribution, by which self-indulgence

brings its own penalty; and of the great law of action and reaction, by which the world keeps its balance and is fenced into its appointed path.

SECOND.—NEGATIVE.

DYNAMIC RELATIONS.

A. — THE NEGATIVE RELATION OF A QUALITY OR OBJECT TO ITSELF.

CHANGE.

We have seen that there is a point where change in quantity becomes change in quality. The change in quality, as change in quantity goes on, has been compared to the length of a knotted cord. Every now and then you come upon one of these knots which marks a change.

Not only is it true that these limits exist. It is no less true that everything tends to pass its limits. Nothing rests behind the limits which are assigned to it. Thus there is a law of change in all things. This tendency of an object to become something different from what it is constitutes its negative relation to itself. It has in its own nature that element, which, so far as its present structure and condition are concerned, will prove its destruction. By fulfilling its own nature, it passes out from its own nature.

The abstract possibility of such change we call time. Time is the abstract possibility of succession, that is, of change. We are conscious of time through change, and we measure it by the different rapidity of the changes that take place in different objects. Objects are so formed, or so related, that mere duration or length of time becomes equivalent to change. By mere existence, prolonged to a certain limit, they become either changed, or as individual objects they pass out of existence. Objects that have not primarily this negative relation to themselves are dependent for their existence upon, and thus mere outgrowths of, others that have this negative relation to themselves, and whose very continuance thus becomes their own change or destruction, and thus the change or destruction of all that depends upon them. The tendency to pass beyond the limit which is affixed to an object becomes stronger according to the strictness of the limit in which it is enclosed. The higher an object stands in the scale of being, the more closely it is subjected to the law of limit, and the more does it tend to pass its limit.

The world, originally a fiery mass, possessed this negative relation to itself, which involved constant change, and which made mere duration equivalent to change. The form of this negative relation was the law of the radiation of heat. This radiation, which was one of the fundamental conditions of the burning mass, involved change with every moment. It could not remain as it was unless time itself stopped. Thus all the changes and convulsions which followed were involved in this first germ. Often the world reached

periods of seeming rest, but the fate of each was written upon itself. Each succeeding form of the earth's surface retained within itself the seeds of its own overthrow. As the earth grew cool, race after race of animal and vegetable life succeeded one another. Each being bound to conditions which were transient was transient also. Those races of monsters, which we just contemplated, seemed to have no limit of size and shape. The limit of time was, however, upon them. The relation to itself of the whole order to which they belonged was negative, and it must pass away, and they with it.

At the present day, some forms of vegetable life seem to have no element of destruction within themselves. A tree, it would seem, might grow forever. But the circumstances change on which it depends, and thus at length it passes away. Some vegetable life, and all animal life, stands of itself in this negative relation to itself. Every animal organization bears within itself the principle of its own destruction. Death is a regular part of the process of life. We are apt to regard it as something superadded to life, as an accident, or at least as something introducing itself from without. We are apt to think that at least it is caused by some defect in the machinery of life, and that, if this defect could be removed, life would run on forever. The contrary of this is true. Death is the natural and necessary result of the merely individual life. The more perfect the organization, the more certain and inevitable is this result. The tree, we have seen, may live for centuries. A reptile, under certain circumstances, may

have its life prolonged indefinitely; such is the case with regard to those toads which have been found embodied in rocks. But in such cases as this, the suspension of death resulted from the suspension of life. When the wheels of life began to move again, death began also its approach. In the case of the higher organisms there is no such reprieve. Finite life, by its very process, like everything else that is finite, passes into its opposite. The process of life is also a process of death.

In the complex organizations of society we find this negative relation equally supreme; each civilization, each structure of social, civil, or ecclesiastical order, rests upon an idea or group of ideas. But these ideas are forms of thought, and thought by its own nature is constant change. Universal principles develop themselves to fresh and special results, and facts, familiar or strange, give rise to new general principles. Thus ideas change no less than outward relations, and a civilization which has grouped itself about an idea is but the shell of a germinant seed. The seed will germinate, and the shell must be broken and destroyed. The task of the historian, often a sad one, is to show how in each civilization lies the sentence of its own death.

This negative relation to itself, that is, the limit which is affixed to everything, and its tendency to pass this limit, is the principle and power which the ancients embodied in their conception of fate. It is the power of repression, of compensation, and of destruction. We may also remark, that if this law of limit, and of the passing beyond this limit, by

which a change in quantity — extensive or intensive — becomes a change of quality, were recognized, it would take from many the prejudice and the dread that they have of any theory of creation by development. No such theory has, indeed, as yet been established, but if one should be established, this development would be only the progress along such a knotted line as has been referred to; and though the line were the same, the difference between what lay on one side of one of these knots, and what lay on the other, although in itself only a difference of degree, would amount to a difference in kind, as complete as though each belonged to a series of its own.

B — NEGATIVE RELATION OF A QUALITY OR AN OBJECT TOWARDS OTHERS.

CAUSE AND EFFECT.

We have seen how each object involves by its nature the necessity of change. This change cannot concern itself alone. Its change is a change in quality, and a quality is the relation in which it stands to other objects, the way in which it is affected by them, and in which it affects them. A change in one object will thus affect other objects, and cause a change in them. We thus reach the conception of cause and effect. This relation is indeed, in itself, the exemplification of the negative relation to one's self. It is the nature of a cause to produce the effect; when the effect is produced, the cause in gen-

eral, as a cause, ceases to exist. Practically, however, there is this difference; an object, as cause, stands not merely in a negative relation to itself, but also to some other object outside of itself. The elements of the process are separated, and stand over against one another. A fusee burning in a keg of powder destroys itself by its negative relation to itself, but *as cause* it destroys the powder which is outside of itself. This negative relation of a body, not to itself, but to an object outside of itself, then, is what marks the present stage of the process we are considering.

The relation of cause and effect was formerly treated in a purely metaphysical manner. Some philosophers denied that we had any such notion as that of cause. Metaphysical definitions were given, which did not meet the circumstances of the case, or did not discriminate them from others. At present, thanks to our modern science, we can give a scientific definition which, while it does not remove all metaphysical difficulty, furnishes a conception of causation more real and clear than has before been possible.

The more strictly metaphysical aspects of the subject will be referred to later in this work, under the title "Propositions of the Reason."

The simplest form of causation is that in which the body itself, which is the cause, passes over into other relations, and becomes effect.

The definition of this form of causation would be *the transferrence of substance*. The rain falls from the sky: this is the cause; the effect is that the

ground is wet. The water has been transferred from the atmosphere to the earth. A light weight is in one scale of a balance, too light to outweigh the substance that is in the other scale. I throw an iron weight into the first scale, and it sinks. Here the iron weight is cause, and it acts by being itself transferred to the scale on which it acts. This is the simplest form of causation. It may, however, become more complicated without changing its nature. In the examples just given, the qualities of the objects transferred in the one case of the water, and in the other of the iron, are recognized in the new combination. In other cases, however, the object transferred loses its distinctive character. The changes that surprise us in the chemist's laboratory result largely from transferrence of substance, though we cannot trace the substance in its new composition save by chemical analysis.

The more general definition of causation is *the transferrence of force or motion.* This is the form of causation that underlies all others, and upon which modern science has thrown such floods of light. It includes the form of causation first referred to, since the transferrence of substance implies and involves the transferrence of force.

I strike a rock with a hammer. The hammer striking the rock is stopped in its descent. The rock may not be broken. Hammer and rock both appear as before. Still the force that moved the hammer is not lost. The outward motion has become an inner motion, a molecular action. Hammer and rock are both heated to a degree corresponding with the vio-

lence of the concussion. Thus no force is lost. No motion is succeeded by rest, but only by a different form of motion, or by motion in a different body. Heat, light, electricity, chemical action, and vital action, are thus shown to be different forms of the same force. This force can be tracked in all its changes. It can be weighed, measured, calculated, with the utmost exactness. This discovery of science, which is called variously the correlation of forces and the conservation of force, is one of the grandest ever made, and the extent of its application and its results is only beginning to be known and appreciated. Instead, therefore, of giving clumsy metaphysical definitions of causation, or getting into metaphysical difficulties about it, we may simply say that *causation is the transferrence of force*. To make this definition complete, the word force should be itself defined. Force is the momentum of action, or that property by which activity is continued under some form or other. An ivory ball in its motion strikes another and is put to rest. The other moves. The momentum of the first is transferred to that. This transfer is, however, not complete. The second moves with less momentum than the first. A part of the momentum of the first is applied to the atoms of each, producing that motion which we call heat.

We cannot indeed as yet prove that the definition thus given includes all the phenomena of causation. There are certain forms of this relation, which we do not yet fully understand, but where no transferrence of either substance or motion can be discovered. Chief among these stand the phenomena of attraction, especially

the attraction of gravitation. It should be borne in mind that this and all apparent exceptions to the general principle of causation are merely phenomena which we do not understand. We cannot say positively that they are exceptions. The attraction of one body by another, of all bodies by the earth, and of all worlds by one another, seems to be force exerted without being transferred. The force of attraction seems to spring into being as the bodies are brought near to one another, and to lessen and finally to be destroyed as they are separated. It may be, however, that some corresponding change, not yet detected, takes place in the internal structure of the body, corresponding to, and making possible this external manifestation of force. This is at least the conjecture of Faraday. We can readily imagine that either the chemical attraction or the attraction of cohesion becomes less, as the attraction of a body for another that is approaching it grows stronger. If anything like this should ever be detected, then gravitation itself would be comprehended under the law of the correlation of forces. Another apparent exception to this law is the very strange fact, that in chemistry two objects, the affinity of which is not strong enough to promote a union, do yet unite at the mere presence of a third body, which remains unaffected by the operation. This uncomprehended fact, which is called by the chemists *Catalysis*, appears to stand in an exceptional relation to the law of the correlation of forces. This, however, may also seem to be an exception simply because it is not understood. It will very possibly be some day discovered that a

molecular action and disturbance is introduced by the presence of the third body, which enables the two first to combine as they were otherwise unable to do, and that this itself sustains some corresponding change.

But we apply the word causation not merely to physical, but also to spiritual and mental, relations, and the question arises, in what manner the definition of causation that has been given applies to these. If it be urged that we know too little of the relations of minds to one another and to matter to affirm in regard to them the transferrence of force, the reply is, that if we cannot apply this definition to spiritual causation literally, we do it figuratively. The word can have no other meaning. The meaning of the word *fall* remains the same, even if it cannot be applied literally to the "Fall of Man." If, however, we confine ourselves to ordinary human, mental, or spiritual causation, we find, in fact, that the law of the conservation and correlation of forces is unbroken. Mental causation, in regard to physical matters, bears a direct ratio to the amount of force contained in the food taken into the system, or otherwise received from the external world; at least it can never go beyond this. Thus it would appear that force is directed, not generated, by the soul.

Further objections to the definition of causation just given, though furnishing no exceptions to it, may arise from the confused notion which many entertain in regard to what causation may be supposed to accomplish. Cause can simply relate to change. There are two classes of facts, then, which lie out of the

range of causation, and cannot be included in any series of cause and effect. The first of these is absolute being, and the second is the primary and fundamental qualities of being. These can be brought under any system of causation, only by reference to the transfer of substance. There the causation cannot be absolute. The confused nature of the popular notion of causation may be seen from the ease with which arguments based upon it have been refuted even by a child. What is the cause of the world is the question, and the answer is, God. The next question is, What, then, is the cause of God, or, as the child puts it, Who made God? By such logic we are carried back and back with no possibility of rest. Causation applies to change. We see a series of changes going on in the universe. We see them all standing in harmonious relations to one another. We may well ask, then, what is the principle of unity in all these different processes and substances? This unity of process, this controlling oneness of plan and operation, is that which we are to seek. We do not ask the cause of existence, but the power which works through existence to a given end. If the universe be, according to the Buddhist conception of it, a dream and a delusion, then it may, indeed, have been created out of nothing. But if it be a real and living thing, then did God impart to it something of his own divine energy. To pursue this topic further would, however, carry us beyond our present discussion.*

* The propriety and usefulness of the application of analogical reasoning

Another point to which the law of causation does not apply is the peculiarity of the primary qualities of substances. Causation is the transfer of force. The force which in one object produces one result, in another object produces another result. One moment it is heat, the next it is light. Why one form of undulation will produce upon us the effect of one color, another that of another color, another that of no color, but of a sound, lies probably beyond the reach of possible discovery. We can analyze qualities to a certain extent, and show the dependence of one upon another, but the fundamental qualities of substances we cannot in any scientific manner explain.

In regard to all these objections and apparent exceptions, it may be remarked, though with some repetition, in conclusion, that the meaning of the word causation is *the transfer of force;* and that the meaning of the word force is *the momentum of activity*. This is the meaning and the only meaning of the word causation, though the word is often used to express, by analogy, a fact not wholly understood. If it be then asked, whether the word causation had no meaning till the truth of the conservation of force was discovered, it can be replied, that this discovery brought to consciousness what had been latent in the soul. The meaning of the word causation was real, yet

and illustration to such vast topics as that referred to in the text will be found discussed in the second book of this work, under the title "Analogy;" while the subject here touched upon will be found taken up again and treated more fully, in some of its relations, in the third book, under the general title "Problems of the Reason."

obscure, as may be seen from the fact that men would use it, even though the philosophers affrmed that it had no meaning. Exceptions to the law of the correlation of force, and thus to the definition of causation which was given above, are merely apparent, and not real; at least they cannot be shown to be real. They are like some unexplained phenomena which the astronomer detects among the stars. He does not look upon them as exceptions to the law of attraction, but as furnishing new fields for its application.

THIRD.—NEGATION OF NEGATION.

ORGANIC RELATIONS.

We have seen that objects stand in a negative relation to themselves in accordance with which their very continuance leads to their change or destruction. The relation of cause and effect is the same negative relation, only the parties concerned in it are separated and stand over against one another. In causation one object stands in a negative relation, not only to itself, but thereby to another. Our common conception of causation is indeed that of a positive rather than of a negative relation. The fundamental notion of cause is, however, that it disturbs the existing state of things. It overthrows the present

order, and the object acted upon is no longer what it was before. There is, however, in this negative relation of a body to itself, a second step involved, to which the process itself leads us. If this change is involved in the nature of the body, then, in its accomplishment, though in one sense it may destroy itself, in another and more complete sense it really reaches and fulfils its true nature. Thus a seed stands in a negative relation to itself. If it fulfils its nature it destroys itself. It exists as a seed no longer. But the real nature of the seed is to produce the plant. Its existence is fulfilled in that. Thus, while apparently destroying itself, in reality it reaches and accomplishes itself. Thus this negative relation is, by the law of limit, and that of the passing of limit, transformed into a positive relation. The negation is itself negated, and we have only positive affirmation. Another example of this we find in the death of man. A higher life springs out of it. We may illustrate the effect of this double negation in the difference between the consciousness of the animal and that of the spiritually instructed and developed man, in regard to death. The animal is unconscious of death. With the consciousness of death in man comes at first the terrible sense of negation and of destruction, until this destruction is itself destroyed, and a consciousness of the immortal life springs out of it. We here see, at a glance, the effect of this double negation. The animal is unconscious of death; man is conscious of immortality. The same process is accomplished, though in a less striking manner, in all cases of the negative relation.

The cause, though it no longer exists as cause, is fulfilled in the effect. The end may be more really the cause than the beginning, for, in the end, the cause finds first its real and complete existence. This is what we understand by the expression, "Final Cause."

A. — FINAL CAUSE.

Where a process is carried on by means of parts co-operating for their own mutual support, or for the promotion of a common end, this composition of parts is called an organism, and the end for which they co-operate is called a final cause. The analytical thought of modern times finds some difficulty in conceiving of an organization as such. It is with difficulty that it gets beyond the thought of a collection or juxtaposition of parts. It has not reached the idea that the parts of an organization cannot exist without the whole, any more than the whole can exist without the parts. We meet the same relation on a higher plane that we found to exist between discrete and continuous extension. We saw that neither a point as such, nor continuous extension as such, can exist. The point exists only in continuous extension; and extension, however continuous, consists of points. So neither the parts of an organism on the one side, nor the organism itself on the other, can have a separate existence. We can see the distance we have passed in our inquiry by observing how much out of place the fundamental axiom of mere quantity would be at our present stage. The

fundamental axiom of quantity is that the whole is equal to the sum of the parts. Let there be a number of men of equal strength. To obtain the amount of their working ability you would multiply the ability of one by the number of men. If their labor, however, be organized, — in other words, if the principle of the division of labor be adopted, — the mathematical formula would fail.

The end for which all work together, which we call the final cause, is really the cause. If you go to a certain city, your object in going is the cause of your movement rather than the locomotive that took you there. A seed is buried in the earth. The warmth and the moisture make it sprout into life; yet if it had not this tendency to life, this final cause embodied in itself, the sun would have shone in vain. Thus, wherever it exists, the final cause is the real cause. In nature, in life, and in history, this is the working power; this sums up all parts of the process in itself, and the beginning finds its real existence in the end, or in the process which leads to the end.

B. — DIFFERENTIATION.

The first step in the evolution of the final cause is a departure from the simplicity and apparent unity of that in which the process is accomplishing itself. The seed has, shut up within it, the germ of the plant. The final cause of the seed, and of the changes which it is to undergo, is the production of the plant. The seed is a simple unit. The beginning of the process which it is its nature to fulfil is the parting of the

cotyledons, that is, the destruction of its unity. This is a type of the entire growth of the plant. There is a constant striving apart. The units which result from each division, as, for instance, the buds that come out on opposite or corresponding sides, themselves divide, and this process is continued through the whole growth of the plant, which becomes with every new stage more complicated. This process of differentiation takes place in all evolution. It is indeed one essential element of organized growth. If we start from the thin and homogeneous ether, which may have been the germ of the world, and trace the course of subsequent changes and evolutions up to the very highest products of political association or human thought, we shall find an unceasing process of differentiation. For instance, in human societies, in the earliest period of barbarous life, every individual, with slight exceptions, fills the same place that every other does. The functions of society are performed by all alike. The more complete a society is, the more complicated it is. Callings are separated. Social functions are divided and subdivided. If we stoop to the lowest form of animal life we find a sack without differentiation of organs, save that the side which happens to be on the inside performs certain duties which that which chanced to be on the outside could perform just as well, if the relative position of the two were changed. Rising to the conception of thought itself, we find that this differentiation is the very life of the progress of thought. The understanding begins by detecting differences in what had before appeared similar, if not the same,

and such difference it continues to discover through its whole existence. Thought has its law of development as much as the seed. Thought divides and branches, and evolves multitudinous diversities out of what had seemed a simple unit. This division is marked in all the forms in which thought embodies itself. The different parties in which a state divides itself are the manifestations of the different elements involved in the fundamental idea of the state. Philosophy takes form in opposing systems; theology in conflicting sects. The idea everywhere divides itself and contends with itself. A superficial glance at religion, at philosophy, at any manifestation of thought, sees only strife. Political history is only the petty contest of politicians. Strife without end and aim seems to be the law of all history. This law is, however, not final. This differentiation is itself the reverse of what it appears. Like the negative relation in all its forms, it passes into its opposite. The negation negates itself, and becomes thereby positive. The differentiation is only a step in the formation of a concrete and united whole.

C. — INTEGRATION.

The law of integration is everywhere present, presiding over, controlling, and directing the process of differentiation. The two seem at first sight utterly hostile, but they are merely two forms of the same process. To be a whole, a thing must have parts.*

The equally mixed assemblage of elements which

* The reader will find a full discussion of the process of differentiation

constituted the ether out of which the worlds sprang, was only in the mathematical sense of the term a whole. Not till these confused elements had become to a certain extent parted and ranged, did they constitute what could be called in any higher sense a whole. The simple unit which a seed represents is only in a meagre sense a whole. As yet, it is rather the abstract possibility of a whole. When it has become a plant, when it has leaves and branches, then it becomes a whole, worthy of the name. This integration, in the lowest sense of the word, requires distinction and order in the arrangement of the parts. In the higher use of the word, it demands the co-operation of all the parts to a single end. We see this law of integration typically illustrated in the example so often referred to of the growing plant. We see, in this, how no part of the divergence is lost. The cotyledons part and fall away. The leaves, however, still represent this primary division. The flowers are a modification of the structure of the leaves. The fruit itself retains the marks of the divisions of the flower. So we find in the large study of history that nothing is lost. Philosophy, politics, religion, gather up what was vital in the systems they leave behind

and integration in the First Principles of Herbert Spencer, who uses the terms, however, in a somewhat different sense from that in which they are here employed. It has been objected to the illustration taken from the primitive condition of the universe, according to the Nebular Theory, that this nebulous mass contained all the elements, that is, *all the variety*, afterwards arranged and added. But if these elements were equally divided and combined, the structure was as homogeneous as if there had been but a single ingredient; or we may suppose the atoms to have been originally of one kind, and the variety of substances to have been produced by difference in arrangement.

them. Christianity contains the transfigured forms of all the world's religions. The complete philosophy has, within itself, the life of all previous systems. History reconciles the claims of conflicting parties, and shows how neither contended wholly in vain.

CONCLUSION.

A glance at the fundamental relations, or categories, which we have thus considered, will show that they are all modifications of a single and simple set of relations or categories. This fundamental system may be thus expressed: affirmation, negation, and the negation of the negation, which results in an affirmation higher, fuller, and more complete than the first, since it involves and retains all the results of the preceding negation. The division of the categories into static, dynamic, and organic, is simply a making more concrete this fundamental division. The static relation is the simple affirmation. The dynamic relation is the negative of this simplicity, while the organic brings back the dynamic into the limits of the static, being itself both static and dynamic. The divisions into which each of these last passes repeat the same process. Quantity is the negation of quality, which negation *limit* destroys, by bringing quantity itself into a qualitative relation. Under dynamics we have the twofold form of the negative relation, the negation of which negation introduces us into the higher organic relations, in the form of the final cause. The final cause, in the realm of organic relations, at first seems to lose itself in the division and strife

which mark the process of differentiation, but finds itself again, complete and concrete, in the process of integration.

These categories furnish the form and the material of our thought, and it is in *thought* that they find their free and conscious manifestation. Thought is the category of categories. All find themselves in thought, while the process of their development is the very life of thought. We have now to follow this process in the realm of thought. We shall start with the *conception*. In the discussion of the relations and process of thought upon which we are about to enter, it will be noticed that logical terms, that is, those that refer to the outward expression of thought, are more often used than those which refer to thought itself. The reason of this is, that since these external relations are the exact counterparts and representatives of the inner, their names answer the same purpose that would be served by the names of the corresponding moments of thought, while at the same time they are simpler, more definite, and involve less psychological difficulty and discussion.

SECOND BOOK.

FORMS OF THOUGHT

AND

LOGICAL FORMS.

FIRST.—CONCEPTIONS AND TERMS.

LOGIC OF LANGUAGE.

THE nature of thought is a matter in regard to which there has been much difference of opinion. Nothing could better illustrate the impossibility of settling psycological questions by mere introspection, than such divergence in regard to the mental processes which fill all our waking moments. The most important opinions that have been held as to the nature of thought are in general these: That we think in pictures, the conception being a form of imagination; that we think in words; and that thought is a mental process distinct from all others.

In regard to each of the two views first named, an important distinction is to be made. It is one thing to say that we think by means of pictures, and quite another to say that our thinking is merely pictorial. It is one thing to hold that we can think only by means of words, and another to hold that our thinking is merely verbal. For myself, I incline to the opinion that we never think without

having as a substratum or starting point for the thought, a mental picture, a remembered feeling, or a word; and that the substratum of thought may be indifferently one or another of these. I am sure, however, that the thought itself is something very different from the mental picture, the remembered feeling or the word, which may make the thought possible. These may be necessary for thinking; they do not constitute the thought.

The most important of the opinions referred to is, that which confounds thought with mental picturing; for if this were true, it would follow that the range of thought is no greater than that of the imagination. A little examination will show the falsity of this theory. How do we think, for instance, of a triangle in general, apart from any notion of some particular kind of triangle? If the thought has any pictorial basis this must be one of two kinds. It must be either some definite form, as that of a right-angled triangle, or it must be a form more or less blurred or undefined, though it is hard to see how the lines of the picture could be distinct enough to suggest a triangle without also suggesting the kind. We are met, then, by the fact that the picture must be of some special kind of triangle; right-angled, isosceles, or some other. It must also be of some particular size. The conception is of a triangle of any kind and of any size. Further, the picture, whether blurred or distinct, represents a single triangle; the conception stands for all triangles. The picture in the mind stands, thus, for something that cannot be pictured. We give to it a represen-

tative character. It is the representative of all triangles. It could not be this if it did not suggest a conception that goes beyond itself and includes all.

There are, further, conceptions for which it seems impossible to find any pictorial basis. What picture could suggest the idea of totality, for instance? If this notion has any mental substratum it would seem that it could be only a word.

What is true of the mental picture, is true of the remembered feeling. This also needs a general character which the memory of no feeling can have when taken by itself.

If we turn now to the assumption that words are essential to thought, it must be admitted that without words, by which conceptions are made distinct and permanent, thought would have remained in a very rudimentary state. By words, a man's thought is made clear to himself; by them it becomes the property of the community. By words, the thought of one age becomes a solid basis upon which succeeding generations may build. It has been well urged, however, that the common experience of seeking a word to express a thought shows that words are not an absolute necessity for thinking. It may be added that no one can claim that we think in regularly formulated propositions; and wherever there is a break in the formal completeness of the proposition, there the thought makes a leap unaided by verbal expression. What particularly concerns us here, however, is the obvious fact, that, so far as words are used in thinking, they are means to thought, and not thought itself. In a mathematical equation the con-

tent of the x and the y, the a and the b, does not concern us. All that is essential is the fact that the contents of these several letters are, or may be, unlike one another. In ordinary thought or speech, on the contrary, words are not thus formal. Each has a content. If we do not know its meaning, the word is useless. This content is a conception.

Having thus seen that thought is not to be confounded with any other form of mental action, we will consider its different forms and stages.

The conception is the simplest form of thought. It has not necessarily any direct reference to an object as actually existing in the outer world. Being thought, the conception involves the two elements common to all thought, the positive and negative, or, as they may be otherwise named, the general and the limiting; or, to give still another phrase more in accordance with the terminology which we shall have to use in other portions of this work, the universal and the particularizing or individualizing. The sensation red is not a conception. When we think of red as a color, we have a conception of it. It involves the two elements,— color in general and this color in particular. We do not, however, necessarily separate these two elements in our thought. We are often, perhaps most often, unconscious of this distinction. We take the conception as a whole, without regard to its formation. Indeed, in regard to the nature, the formation, and the relation of conceptions, there is no more fallacious guide than consciousness. Many processes of our thought pass at once into oblivion. Many change their nature when we contemplate them.

Fortunately we are not left to the varying and often fallacious guidance of consciousness in this matter. Thought at once embodies itself in language. The conception takes form in the term. By a term is meant a word, or words, by which a conception is expressed. Words in their formation and changes bear the living impress of thought, and by the study of words we can often settle questions that otherwise would be insoluble. We can thus learn more of the nature of the conception by studying the *term* which is its concrete expression, than by studying the conception itself. To it, therefore, we will address ourselves.

A term has just been stated to be the expression of a conception. This is sometimes denied by those who affirm that the term (a word) is the name of a thing. The truth is that the term is *immediately* the name of a conception; *mediately* it may be the name of a thing. If the conception stands for an outward object, and the term stands for the conception, the term, indirectly, stands also for the thing. Both of these statements must be kept carefully in mind. One of them is commonly omitted. Logicians and metaphysicians commonly assert that words are the names of conceptions. This is true; but if it be left out of the account that conceptions directly, and thus terms indirectly, may stand for things, the discussion becomes partial and vague. On the other hand, Mr. Mill and others assert very positively that words are the names, not of conceptions, but of things. What according to this view the word is the name of, when there is nothing answering to it but a conception, is

not clear. Words follow all the varying forms of human thought. Human errors, human dreams, all express themselves in words. The word answers to human thought. It is a record of human thought. It is the name of a thought. If the thought answer to a thing, then the word also answers to a thing. A homely comparison may illustrate the whole matter. You stand by the sea-shore and pull a boat by means of a rope. Do you pull the rope, or do you pull the boat? Most metaphysicians, if the analogy to the position above described were preserved, would say that you pulled the rope. Mr. Mill, looking at your purpose and consciousness, would say that you pulled in the boat. If a landsman were in a boat, and wished it to be pulled ashore, he would throw a rope to some one standing by, and say, "Pull in this boat, please." An old salt would throw the rope on shore, and call on the bystander to haul in *that line*. Thus metaphysicians occupy the place of the sailor with whom the handling of ropes is a profession. Mr. Mill and those who agree with him occupy the position of the landsman. If the rope should break, the man on shore would find that it was the rope, and not the boat, that he was pulling. We will content ourselves with saying as above, that *immediately* he pulls the rope, *mediately* the boat, and thus we tell the whole story. This may illustrate the position that words are immediately the names of conceptions, while they may be mediately the names of things. In this latter case there is no harm in speaking of them in their mediate relation, although such use is unscientific and may easily lead us into difficulty.

The determination of this matter in the case of any particular word depends, first, upon the belief of the speaker, and, secondly, upon the facts of the external world. If a person uses a word, believing that the conception for which it stands has a counterpart in the outward world, he believes that the word stands for a thing. If the conception have such a counterpart, the word does stand for it. In this work I shall speak of the word in its popular use, as standing for an outward object, returning to the strict scientific usage where it is necessary for precision.

We have now, however, to consider the word strictly as the name of a conception, and to observe how language shapes itself according to the thought which it embodies, so that it becomes a living organism.

So far as the Indo-Germanic languages are concerned, the word, like the conception for which it stands, consists in general of two elements: namely, one which, with reference to the group of words possessing the same derivation, may be called universal; and another, which limits this giving to it a particular significance. The universal element is represented by the root of the word. In the Indo-Germanic languages this has a verbal significance. In other words, it represents some form of activity. It is probable that originally this action was an outward one. The expression was, however, so large and vague that it could be applied to various analagous processes, even to those of the mind. The root of a word may thus be regarded as representing its more general element in two ways. In the first place, as was intimated above, its universal charac-

ter appears from the fact that the same root gives life to many different words in which its significance assumes as many different forms and applications. In the second place an action is something that has no separate existance except in our own mind. It is thus the result of abstraction. This verbal root we may compare to the nerve and artery of a bone. It is the vital point of it, and by it the word stands in connection with the great body of human speech. A language is full, rich, and living, so far as it retains its roots in a significant form within itself, and its words still consciously pulsate with their life. It is hardly fair to call language living or dead, according as there are, or are not, living men who make it their language. Language is properly living that retains its connection with its roots. In this sense the Greek will always be a living language. Among modern languages, the German represents, to a great degree, this fulness of life. On the other hand, the French may represent a derived language, that is, one that has been cut adrift from its roots, and is in this sense dead. The German shows its life in its pronunciation. The accent of the words follows their life, and represents with logical accuracy the development of the word. French words have no accent. By their very utterance they show that their parts have no vital connection. The German words further show their life by their readiness in uniting. You can graft the words into one another, and their lives will coalesce. French words show their lack of life by their lack of any power of combination. They will not grow together any more than so many dead sticks. The German

language has, further, the richness and fulness which spring from the vital presence of roots, whose meaning is not yet exhausted, but which are ever ready for new uses, and suggest more than they strictly express. Such language is fitted for poetry and philosophy, and all the higher uses of the imagination.. The French language is never less at home than in the flights of poetry, or the profoundness of philosophy. The German language is, on the other hand, by this very fulness, less fitted for the strictness of science. Its scientific terms are vague, and to an outsider somewhat ridiculous. To speak of hydrogen as *Wasserstoff* (water-stuff), and nitrogen as *Stickstoff* (stifle-stuff), can hardly help exciting a smile. The French language has all the merits which result from precision. The growth of its words in the vital, normal, and unconscious form of growth, has nearly reached its end. Its words have a distinct and definite meaning. Its science is accurate and precise to a hair. Moreover, its expressions admit infinite point and polish. They may be wrought and smoothed like dead bone or shell. Thus they are piquant, fitted for wit and for the interchanges of society. The French language is moreover rich in idioms. Idioms arise most freely when a language is cut loose from its original roots, and the meaning of the words has thus become, to some extent, arbitrary. They are thrown about among one another, and acquire, by various chances, meanings foreign to the original ones. Sometimes these foreign meanings result from gross blunders. I see every day in my paper an advertisement of "troche powders." The

inventor of the medicine evidently understood the meaning of *troche* to be a medicine for bronchial troubles, rather than medicine in a particular shape. An omnibus-maker in one of our cities, awhile ago, brought out a new omnibus marked in flaming letters with the name "Hydrant." He had seen the name on fire-engines, and liked it, and did not see why it would not look as well on an omnibus. It probably suggested to his mind something about the hydra. Now, if these blunders had become incorporated into common speech, the words would have acquired a meaning utterly foreign to their organic significance; they may thus illustrate one fertile sense of change in the meaning of words, but change that could not arise while the words carried their root-meaning with them. Idioms that are not of the blundering sort add to a language vivacity and brilliancy. The effect of them is something like that of puns. They startle us with a pleasant surprise. The idioms of a language are not essentially different from slang. Slang terms are the idioms of low society. The French language has all the conditions necessary for the production of idioms, and sparkles all over with them. The vivacity of the French mind imparts a brilliancy to these idioms, and is in a peculiar manner at home with them. The growth and power of idioms may be well illustrated by the French word *belle-mère* meaning *mother-in-law*. The French had a word in common use, which meant mother-in-law, the word *marâtre*. This word came to be used in a bad sense. It became a general expression for harshness and hardness. French politeness, or it may be

French tenderness, substituted for it the most graceful expression that could be devised, and the *marâtre* became the *belle-mere*. Thus idioms are what we may call the play of words after their regular development has reached its limit, or outside of this regular development.

The English language occupies an intermediate position between the French and the German. It is further removed from its vital roots than the German; not so far as the French. It thus possesses some of the advantages of each. It avoids some of the defects of both, while at the same time each is superior to it in respect to its own peculiar excellence. The greater distance in which it stands from vital connection with its roots than that occupied by the German may be seen by comparing words in the two languages, and seeing how much more dwarfed is their meaning in the English. In the German the word *Stall* means *stable*. In English it is a small part of a stable. The German *Tisch* is a table. Our English *dish* shrinks into something very different.

Words have power to us as we can trace their universal meaning; that is, their radical life in the limitations which they have assumed. Most words to most of us are dead. We associate them merely with hard, outward forms. Glass is a shining, transparent object. *Glass*, in its original use, meant something that had been melted. The word contains the genesis of the substance. It sees it emerging, forming itself from the seething mass. In our use it has become cold, hard, and brittle. The word *salmon* suggests to us a savory meal. In its original

etymological meaning, the word expresses the grand leap of the living fish, making magnificent headway against the cataract. The effect of having fresh in our minds the fundamental meaning of a word may be seen in the difference between speaking of *eradicating an evil*, and of *rooting it out*. This is the secret of the great power of our Saxon words. We may well call them pithy, for they have the pith still in them.

Enough has perhaps been said to illustrate the general development of language from the universal to the particular and the individual, and to show how in every word the two elements that were described as positive and negative, or as universal and particular, are united. To follow this development in the derivation of words and the organization of language is beyond the scope of the present work. We will content ourselves with considering, very briefly, these relations, as they embody themselves in grammatical forms.

From what has been said, it will appear that the verb is the most purely universal of all terms. It implies a state or action, separate from all connection with individuals, and in the simplest form. Verbs of course admit of different degrees of particularization among themselves. *To move* is a more general term than *to run*, *to walk*, or *to fly*. *To be* is the most universal term, though it is not absolutely universal, since it particularizes *being* in opposition to *non-being*. It represents, however, the starting-point of speculative thought. The Eleatics affirmed *to be* and that only. It is the beginning of religion,

as it is recorded in the Bible. Jehovah, or as it is expressed in the first person, the *I am*, is the name by which God was worshipped by the Hebrews. It is the beginning of speculative thought, in the individual as well as the race. It is the starting-point of reason, the only absolute datum. It is the beginning, expressed or implied, of all statement. We say *I am*, *he is;* whatever follows is limitation or definition. We have, then, verbs of various grades of generalization from the most universal, *to be*, to those representing more particular states or actions, such as *to slip*, *to strike*. But in all, the verb is, when compared with other parts of speech, the most universal term. It solves the fixed, it connects those which had stood motionless over against one another. The verb is the life of the sentence. It is the relation between its parts. And life and relation are more universal than that which lives and is related. The verb is like the attraction of the planetary system, which might seize a world standing aloof and immovable, shut up in itself, and whirl it away to become a part of the great whole, and subject to the common influences. So the verb breaks up the isolation of the objects which fill the rest of the sentence, and brings them into the common system of action and reaction.

The limitations which the verb undergoes in connection with other words do not concern us here. We have here only to notice the limitations through which it passes in its own development. These are twofold, — limitations of mode and time. The infinitive is spoken of as the infinitive mode. This is not

strictly correct. The infinitive is that which is above and behind all mode. It is the infinite, the unlimited. *To be* is not a mode or form of being. It is that which underlies all these forms and modes. *To go* is not a mode of going, any more than happiness is a mode or form of happiness. The infinitive, then, is, as its name implies, the unlimited. To understand the theory of modes, we must remember that words are primarily the names, not of things, but of our conception of things. The *mode* is not that of being, but rather of our conception of being. This may exist in the intellect, in the emotions, or in the will. These two last modes do not imply any logical relation. The one would be the optative, the other the imperative. The optative regards its object either as existing, or as not existing, or as hypothetical; that is, the emotions regard it through the intellect. It requires, then, no separate form for its own expression, though such a form may be given to it. There are three forms, and three only, under which the intellect can conceive of existence. It may regard it as having objective reality, or as not having this, or it may regard it without reference to its reality, that is, hypothetically. We have thus three modes of conception, technically, though not with much reason, called the indicative, the conditional, and the subjunctive. Better names would be the positive, the negative, and the hypothetical. The positive form is thus: *he is*, or *he is not*. The last is as positive as the first, so far as the form of the verb is concerned. The *not* is merely the predicate. Very different is the purely negative mode, *if he*

were. This implies, by its very form, that he is not. It implies it more strongly than the positive with the negative predicate, because the negative is involved in the word itself, is in a manner united with the positive. It is thus often the language of passion. *If he had been a man, he would not have done this*, is a stronger expression of feeling than, *he did it because he was no man*, or because he was inhuman. The third mode is thus expressed: *if he be*. This implies nothing in regard to the actual existence or non-existence of the supposed case. It looks upon the action or state by itself, without regard to its existence.

Much confusion is introduced into our grammars, from the fact that the negative and hypothetical modes are regarded as distinctions not of mode but of time or tense. The negative mode is made the past tense of the hypothetical or subjunctive mode. The reason is, that our grammars are based more upon outward resemblance than inward relation. Thus, in the Latin grammar, the learner is confused by different sets of rules for the different tenses of the subjunctive. It must be admitted, at the same time, that most languages, particularly the Latin, are formal rather than logical; that is, they consult resemblances of form, more than logical relations. In the German language, on the contrary, the logical law prevails. In this, the modes may be studied free from everything that is formal, in their purely logical relations. The fact that inflections of the negative mode imitate those of the past tense springs from the feeling that what is past *is not*, and can never *be*.

The past form, then, is the one which presented itself most naturally for this use.

The fact that the hypothetical mode, when it resembles the present of the indicative, is more regular than that, as in the German and English, shows that it is a later product. When it differs from the present, and assumes a form more like the future, as in the original form of Latin conjugation, — that is, in the conjugations called third and fourth, — this arises from the fact, that the future, being contingent and hypothetical, offered itself more readily for this use. The important point is this: the distinction between what we have called the negative and hypothetical modes is modal. The resemblance to distinctions of tense or time is merely the means of expressing, by some analogy, this modal relation.

This is all that need occupy us as far as the development of the verb is concerned, because it is all that has a direct logical value. The whole development of the verb, is, however, logical, and might be considered in a more extended discussion. Certainly, while logic derives such help from grammar, the reverse should be done, and our grammars placed upon a direct logical footing.

The verb, we have seen, may be regarded as the most universal term. The adjective may be regarded as especially the particular term. It may, it is true, become, and sometimes is, a universal term. Its natural and more common use is, however, as a particular. At least, this is what is peculiar to it when compared with the verb.

Two considerations will illustrate the fact, that the

natural use of the adjective is to develop the particular antagonisms contained in the more universal verb. The first is, that adjectives are developed in pairs. Thus we have *good* and *bad*, *fast* and *slow*, *wise* and *foolish*, *hard* and *soft*. We can, indeed, hardly think of an adjective, which does not at once suggest its antagonistic one. So common is this, that where an adjective does exist alone without a mate, it is fair to infer, either that it has lost its original meaning, or else that its mate has become obsolete. The second illustration of the peculiar tendency of the adjective to a particular significance, compared with the more general use of the verb, is the looseness with which verbs are used, and the precision with which adjectives are used. Each adjective not merely has its antagonist, but when it is used it expressly excludes that. The verb has no such distinct and exclusive meaning. No matter how slow the movements of a person may be, he will hardly hesitate to speak of *running* over to see a friend. No matter how he may have been disturbed at his hotel, he will say that there is where he *slept*. If a person says that all his friends *live* in England or France, he does not mean that none of them have died. How different is the meaning of the adjectives which correspond to these verbs, *asleep*, *awake*, *alive*, *dead!* Each distinctly and carefully excludes its opposite. A person says that all his friends in France or England are *alive*. Here the sense is precise. None of them have died. It should be remarked, however, that the participial form of the verb is intermediate between the verb and the adjective.

I have said that the adjective, though peculiarly an expression of a particular relation, may be used as a universal term. It will be clear, from what has just been stated, that it never does this in the full, unqualified manner that the verb does; that is, without any regard to its opposite. It remains to observe the modifications which it undergoes in this twofold use. This will explain the distinction better than any elaborate discussion.

The school-boy is commonly surprised by meeting in his Virgil this expression: "*Varium et mutabile semper Fœmina.*" Without regard to the meaning of the clause, its construction seems to oppose all the rules for the adjective which he has learned. The noun is feminine, the adjective is neuter. Nothing could better illustrate the truth, that the natural use of the adjective is to express particular, rather than universal relations, than the fact that cases like this where the language marks as plainly as it can the other use of the adjective stand in such contrast to its general use by Latin writers. Let us look more closely at the nature of the agreement of predicate adjectives. *These horses are black.* In this sentence the word *horses* is understood, or may be supplied. The meaning of the sentence is, *These horses are black horses.* They are distinguished from white ones, or from those of any other color. If our language admitted of adjective agreements, the adjective in this case should agree with its substantive *horses*, not that substantive which is the subject of the sentence, but that which is understood with it. Take as an opposite example, *Lead is heavy.* We

could not here supply, or understand the substantive, lead, with the adjective. We cannot say *lead is heavy lead*, for the adjective has a wider sweep than the substantive which is supplied. The one use of the adjective places the object in a particular class of such objects. The other goes beyond the entire range of such objects. In the former case there should be agreement of the adjective with the noun, if the language admits it. In the latter, there is no need of such agreement, unless the forms of the language require it. If there is such agreement, it is because the language respects the regularity of forms more than it does the changes of relation. Take the Latin clause referred to. The word *Fœmina* could not be supplied with the adjectives, as is supposed by agreement. We could not change the sentence to *Fœmina est mutabilis, se Fœmina*. There is, then, no reason for agreement. The neuter is here regarded as taking the place of a noun. If any substantive is to be supplied, it is the neuter substantive *genus*. This might well be supplied.

The French language, which is, more than any other, the language of the understanding, that is, of sharp distinction, delights to mark very narrowly this difference in the use of the qualifying adjective. When the adjective puts the object expressed by the substantive into one class of such objects, thus particularizing to what kind of such objects it actually belongs, it is in the French language placed after the substantive. If it has not this logical force, it is placed before. The reason for this method of arrangement is, that the adjective, by being put after

the noun, gains additional emphasis; and, as we shall see later, the element that reduces a conception from a universal to a particular receives always accent or emphasis, to mark the exclusion of all other members of the class referred to. If I say *a black horse*, I mean to contrast the animal with those of any other color, and to exclude the possibility of any other color. This emphasis of exclusion is what is expressed in the position of the French adjective which has this particularizing force; and there is hardly anything more interesting than to see how the laws of grammar, which seem at first sight so hard and arbitrary, are simply the laws of the expression of logical relations in concrete forms.

When the adjective has not this logical force, it may either express something which is common to all individuals of the class, and thus be merely an intensive; or, it may express the emotions excited in us by the object, and thus have a merely subjective use. Thus, all scholars are more or less learned; all men are not. If I say *a learned man*, I make a distinction between him and other men who are not learned. If I say *a learned scholar*, the adjective has merely an intensive force. The French say, therefore, *Un homme savant*, and *Un savant écolier*. *Un homme grand* distinguishes the tall man from others. *Un grand homme* expresses simply my admiration. *L'homme pauvre* describes the man's actual state in contrast with the rich. *Le pauvre homme* expresses simply my pity. Words expressing shape, color, and the like, qualities which we at once recognize as peculiar to the object, have most

obviously a particularizing force, and take their place uniformly in accordance with this. Words that express qualities which imply research, in regard to which our judgment may be wrong, or different from that of others, are naturally subjected less strictly to this rule. But the shade of meaning which the adjective has varies according to its position, even where this is left free. French authors often avail themselves of this power. One, by putting more often his adjective before the noun, gives a richness and depth to his style; while another, by the opposite course, gains an air of objective reality and logical accuracy.

We have seen that the adjective may be either a particular or a universal term; that is, it may put the object spoken of into a particular class of such objects, expressing a quality more general than the whole class. In the former case, there should be agreement of the predicate adjective with its noun; in the latter, there need not. A study of grammatical forms shows us that a predicate adjective *may be regarded* as a universal term, even when it puts the object spoken of into a particular class of such objects; that is, the general quality may be affirmed without regard to other objects of the same class. An example may show the necessity of this. Take such a sentence as this, *These horses and cows are black.* Here, certainly, we do not mean simply these horses and cows are black horses and cows; we mean to establish something in common between them, to reduce the whole under one term. The adjective must, then, in this case, be regarded as a compara-

tively universal term; if it must be so in this case, it may be in any other. This is the view which the German language, the most philosophical of all languages, — that is, the language most under the control of the reason, as the term will hereafter be defined, as the French is the one most under the control of the understanding, — takes of the adjective in the predicate. It gives the adjective in its ground-form, with no agreement of termination. It thus represents the predicate adjective as a universal term, without regard to other objects of the class to which the subject of the clause belongs.

Much of what has been said of the relation of the adjective to the substantive may be extended to that of the adverb to the verb. The adverb limits the verb, reducing it from the universal to the particular.

The verb has been defined to be the most universal term. The adjective represents the particular. Neither the verb nor the adjective can ever be an individual term. This is peculiar to the substantive. This alone can represent the individual. It may, it is true, be used as a universal, or as a particular, term, but when compared with the parts of speech before referred to, its relation is rather that of the individual. The individual stands not merely in the relation of the one to the many, but of the concrete to the abstract. The verb by itself expresses only action, general and vague. It attaches itself to nothing and springs from nothing. It can have no concrete, or, what is the same thing, no actual existence without the substantive. It is so with the

adjective. The adjective expresses an abstract quality. This quality can have no existence by itself. It must belong to something. This thing is represented by the substantive.

While the substantive may be regarded as occupying this individual relation, it yet involves within itself the possibility of assuming any logical relation. It may be used as universal, particular, or individual. We have, then, to consider the substantive in these three relations, and the manner in which it is reduced from one to the other. Our grammars sometimes speak loosely of two kinds of substantives, proper and common. The common noun is the name of a class; the proper, of an individual. This is an arrangement to which the low standard of thought would naturally lead. It leaves out of the account abstract nouns, — that is, absolute qualities. It recognizes no absolute virtue, no absolute truth. There are only truths and virtues. More commonly, however, three kinds of substantives are recognized, the proper, the common, and the abstract. These represent severally, the individual, the particular, and the universal. Here our grammars are apt to stop. But take the word, *iron*, *silver*, or *gold*. These are certainly not proper nouns. They are not names of individuals. They are not common nouns. There is only one gold. They are not abstract nouns. Our eyes have seen these metals. Our hands have handled them. Take also the name of any disease, or of any action. We should have the same difficulty in reducing either of them to the three heads beyond which our grammars do not go. The *a priori* method is the

only one that can divide nouns by a complete and exhaustive classification. We have, then, first, individuals and classes of individuals. The understanding divides these individuals into their elements. Each possesses, on the one side, certain qualities, and, on the other side, a substance or material in which these qualities exist. The union of these two elements forms the object. A stove has on the one side its size and its shape. On the other side, iron is the material which is the basis and substance of these qualities. We have, then, besides proper and common nouns, these two other kinds, which result from the analysis of the understanding, names of qualities, and names of material. Still further, these bodies exist now in one state, now in another, now in a transition from one to the other. This gives us two new sorts of nouns, — those implying state, and those that express any form of activity. We have thus six classes of nouns. There is no danger of any more being discovered to increase the number. The four last would, like the abstract nouns of our grammars, most naturally fall under the head of universal terms.

We have thus considered the difference in the noun itself. We have now to consider how any given noun may be reduced from a more general to a more particular or individual form. First, we must consider its reduction to a more particular signification. Two ideas or conceptions must limit one another, in order that there may be reality, just as two lines must meet to form a corner. In representing this process by language, the word which represents the leading conception is said to be limited by the other. The most

obvious form of this limitation is by the adjective. Thus, we say *a horse*. Limiting our thought to a particular kind of horses, we say *a black horse*. The last expression is more particular than the first. The same result is, however, produced by combination with another substantive. We say, thus, *a truck-horse*, *a wine-glass*. These two forms of limitation must not be regarded, however, as identical. They are often so regarded by those who write for effect, who imitate, as they suppose, the structure of the German language. They form compound nouns, in utter unconsciousness that their meaning is any way different from that of a noun limited by an adjective, or in any other method. A compound noun has no right to existence, until the conception for which it stands is a fixed and a peculiar one. If a truck-horse were merely a common horse used for a special purpose, if a saddle-horse differed from others only by a momentary use, they would have no right to be represented each by a recognized and permanent word. This right is gained by the fact that each does express a conception as distinct and permanent as the word. If we express the universal by its initial letter U, and the particular by its initial P, then the formula for each compound noun will be P U. This formula is almost universal in every logical language. Very rarely, in the Indo-Germanic languages, are words formed by mere accretion. The relation between the two members of a composition is merely formal. Each may in turn serve as the universal, each in turn as the limiting, word. We can say *horse-cart* or *cart-horse*. In each case the formula is the same. The

last word of the composition expresses a general conception; the first limits it. The symbol given above, P U, may also stand for the adjective with the substantive, with this difference, that one is a permanent, the other a changing, composition.

This logical relation is expressed by the accent. The reduction of the universal to the particular is carried on by means of opposition or exclusion. This is represented in the formation of words. I speak of glasses. They are of many kinds. If I say *wine-glass*, I exclude all other kinds. This exclusion and opposition is what is signified by emphasis, and in many cases by accent. The accent on the first of the elements of compound words, in the German and English languages, expresses the exclusion of all other forms of the general conception.

This signification of emphasis, or of stress of voice of all kinds, is one of great importance, and of strictly logical signification. If we hear a man saying emphatically, it *is* so, we take it for granted that he has been contradicted, or that he expects to be. Emphasis may be grammatical or rhetorical; it, however, always implies opposition. Take such a sentence as this: *You speak well.* The grammatical emphasis falls upon *well.* This limits the conception in the verb *speak.* Rhetorically the accent may fall anywhere else. You *speak* well, implies an opposition between your speaking and your action.

Accent may be of two sorts. It may be logical or euphonious. In a language derived from foreign roots, where words do not coalesce into compounds, there can be no logical accent. The French and the

German nations are the most logical of all. In the German language, the logical principle of accent reigns almost universally, for nearly all its words are logical compositions. In the French language there is no accent. The words are not logically compounded, and have thus no right to be accented. The accent in the Spanish and Italian languages adds simply to their euphony. It is superficial; that is, it has no connection with the significance of the words. The language sounds better for them, but it has no fuller meaning. It is melodious, not harmonious.

We must carefully distinguish between accent and the semblance of it produced by the diminished force with which terminations and similar affixes are spoken. In the word *garden*, the first syllable is not accented. It is spoken with no more force than the monosyllable *guard* would be spoken.

Words, then, imitate in their composition the actual realities of things. Objects are distinguished from one another by limitation. One color, for instance, is produced by excluding the other elements of light. Without this exclusion there would be no color. Limitation is, by its very nature, exclusion; as when I put a fence round my land to shut out trespassers. Hegel remarks that zoölogy has fallen in with the course of nature in dividing the genera of animals by their teeth and claws. It is by means of these, that each genus has preserved itself, and continues to maintain its separate existence. The extinct genera have become so because they had not sufficient of this opposing force wherewith to maintain themselves in the world. It is so with nations. Each preserves

itself by its power to maintain itself in the world. A nation that exists by sufferance can hardly be called a nation. All of this warfare for being, this existing by exclusion, that which Darwin describes so forcibly as the struggle for existence, on which is based the natural selection by which one individual or class is preserved and another destroyed, — all this is expressed by the accent with which a term, limited to a specific meaning, excludes all other uses. What in the spoken language is expressed by emphasis is in the written language expressed by position. A word may be emphasized by being placed at the beginning or at the end of a clause or sentence. All languages allow a certain play of this kind, but in this respect the Greek stands pre-eminent. The Greek sentence is in its structure as flexible, as expressive of every delicate shade of thought and feeling, as the human voice could be.

We have seen how the universal may be reduced to a particular; we have now to see how it may be reduced to an individual. This is done by means of words having an individualizing significance, such as demonstrative pronouns, and possessive adjective pronouns, and by case. The limitation by pronouns is clear without illustration. There is an important difference between limiting a substantive by the genitive of another substance, and limiting it by an adjective. The words of a king are not always kingly, the acts of a man are not always manly. The genitive marks what belongs to the individual; the adjective what belongs to a class. We have seen before, that language has no right to form a compound noun until

there is some permanent conception to be expressed by it. We now see that it has no right to form an adjective of a substantive, until what pertains to this substantive is found to have a specific difference from what does not pertain to it. Of all the correspondence of a public officer, only that can be called official which he writes in his official capacity. This, too, is a matter in which affectation often sins against the genius of language.* We see also the increased power which is attained by this use of the adjective. There is a difference between the American people and the people of America. The phrase *People of America* implies simply an individual geographical relation. The phrase *American people* suggests the *idea* of the nation. It brings with it all the peculiar good or evil connected with it. It is remarkable that, with the exception of the American Indians and the people of the United States, no one of the other nations on the continent is habitually designated by the adjective American. In our difficulties with Mexico, the inhabitants of the United States were alone called Americans. The Mexicans have, it is true, qualities which distinguish them from other nations; they have, however, nothing which separates them, as a distinct class, from the inhabitants of other continents. The United States, alone, have become conscious of, and are the expression of, the American idea. The virtues,

* Especially does the German language, in spite of that philosophical character which I have noticed so frequently, often violate this rule. We see so often such a phrase as this: "*Cotta'scher Verlag.*" It is as if we should speak in English of the "Appletonian" or the "Spencerian Bookstore."

and the faults, the whole national spirit of this people, could not exist on the other side of the ocean.

It is not worth while to do more than refer to the exceptions to this principle. The French cannot form readily adjectives from nouns. The preposition *de* is with them the representative of the genitive and ablative cases, as well as of the Latin preposition *de*. *De*, with the article, expresses the individual relation; without it, the particular. We have also, in Latin, the rule for the genitive or ablative, expressing property, character, etc. In spite of such occasional exceptions, the general principle is true, that if the letter I stand for the word individual, the genitive, with a substantive limited by it, may be expressed by the formula I U, the genitive reducing the universal to the individual.

By this examination of the development, the changes, and the relations of language, we have seen in objective reality the manner in which, in every conception, the two elements of the universal and the particularizing, or of the universal and individualizing, co-exist, and the changing relations which these assume, as the conception develops itself in the fulness of its many-sided life.

SECOND.—JUDGMENTS AND PROPOSITIONS.

A word, as we have seen, represents a permanent conception which, as such, has both generic and specific characteristics connected with it. These characteristics are at once suggested by the word, and in general without a parti ular analysis of it. The word *Englishman*, or *wineglass*, suggests each its distinct conception, as much as the word man, or glass, and probably, for the most part, with as little thought of its derivation. It suggests, also, characteristics not necessarily contained in either part of the word. Each word suggests a distinct and specific conception. A substantive with an adjective suggests a conception already formed by the mind, but which has not this specific and permanent character. It contains also, in general, little that is not contained in the separate words. It expresses this conception without any regard to its external truth.

A proposition utters a conception in the manner, if not at the time, of its formation, and at the same time it decides in regard to its objective reality. The parts of which the conception is composed are brought together in our sight; at the same time its truth is affirmed. One may say *A wise man*, *A beautiful picture*, and we have merely a floating conception, which admits neither of opposition nor defence. If

one say, however, *The man is wise*, *The picture is beautiful*, we have something, which, if it have no objective reality answering to it, is worse than useless, something which may admit of denial and support. It may be thus the centre of strife, and if true may increase our knowledge or advance our prosperity.

With the proposition, therefore, we first enter the realm of outward reality. In a proposition, then, the elements which are united in the term stand over against one another, while at the same time their mutual relation is affirmed. As the term represents and corresponds to a conception, so a proposition represents and corresponds to a judgment. A judgment is the mental action which expresses itself in the proposition. To understand the nature of a judgment, we need, then, only study the nature, the elements, and the relations of the proposition.

A proposition consists of three parts, namely, that of which something is affirmed; this is called the subject: that which is affirmed of the subject; this is called the predicate: and the connecting or affirming particle, which is called the copula, which is sometimes, however, not distinctly expressed, the affirmation being included in the predicate. This is the case when the predicate is itself a verb.

The formula, then, for every proposition is this: The subject is the predicate. This, though the absolute formula of all propositions, is in itself false. From the definitions which have been given, it may be seen that the subject and predicate are very different from one another. They stand, indeed, in a pure antagonism to each other. We must, therefore, go be-

hind this formula, and see what is represented by the subject, and what by the predicate, and how far their identity may be affirmed. A conception is made up of the two elements, which, taking their extreme forms as representative, we have called the universal and the individual. In other words, it is a limited universal. If the proposition corresponds to a conception, it must contain these two elements. We have, then, another formula for the proposition, which gives us much more insight into its nature than the former. It is this: The individual is the universal. Thus, in the proposition *The man is wise*, man is an individual term, wise is a more universal quality affirmed of him; so that the abstract formula would be as stated above: The individual is the universal.

All that is meant by the formula just given is, that the predicate is more universal than the subject, and this is true of all logical propositions. Although the predicate may be an adjective, and thus, as we have already seen, a particular term, it is always more general than the subject. If I say *A wise man*, the word man is limited in its signification by the word wise. The universal, man, is reduced to the particular, wise man. But when I say *The man is wise*, man is already individualized by the article, so that the particularization, which in the case of the descriptive adjective is a limitation, becomes, in the case of the predicate adjective, a generalization. Thus, in every proposition, either the subject substantive is thus limited, or else the predicate adjective goes beyond, or is supposed to go beyond, the

whole class to which the object belongs: either it is of the nature of the phrase, *These men are wise*, or of this, *Man is rational*.

Mr. Mill, indeed, in his able and searching review of the Philosophy of Sir William Hamilton, denies that when a quality is affirmed of any individual, or any class of individuals, we go beyond the relation directly before us. The example which he uses is this: *All oxen ruminate*. The relation, he says, of this attribute to this subject, is the entire matter of judgment. The phrase, *Oxen have horns*, he would, doubtless, explain in the same way, as well as any similar judgment. I have stated before, that in these matters our consciousness is entirely untrustworthy. We cannot, by observation, detect the quiet and secret operations of the mind. In this case we must turn to the revelations of language, which expose the secret processes of the thought with the same naïve fidelity with which the rocks reveal the tracks of animals long extinct. In this case the verdict of language is decisive and unmistakable. Few languages, indeed, have sufficient delicacy and logical accuracy to note such facts, but the French and German languages have these qualifications, and representing, as they do, minds the most unlike, they may represent all intermediate minds. The French language, in all such cases where it is possible, that is, where the predicate is a noun or a pronoun, uses the partitive form. Mr. Mill, in the phrase, *Oxen have horns*, would affirm that the thought does not go beyond oxen and their horns. The French language says, *Les bœufs ont*

des cornes, thus photographing the unconscious generalization of the mind. *Mon frère a du courage*, — in this phrase we have the same fact. It is not, indeed, necessary to multiply examples. All that is needed is to note, as we have done, their application to the question at issue. The German language is equally decisive, though less obviously so. The reader has only to make it clear in his own mind, that the absence of the article in the German is equivalent to the partitive form of the French, to be convinced that its verdict is the same. *Die Ochsen haben Hörner*, says the German, with a predicate as truly partitive as that of the French phrase above given.

It will be seen that the formula, The individual is the universal, is not the only proposition that could be affirmed in regard to the same elements with equal truth. We may say, with equal accuracy, the individual is the individual, or, the universal is the universal. The universal is the individual we cannot say. In the two former cases, however, as there is no distinction of subject and predicate, the formula becomes useless, and may be cast aside. We have then, in their place, the mere proposition of identity, of which the formula may be stated very simply, — *a is a*. This proposition of identity has been regarded by logical writers, even by Hegel, as empty and barren. It is not a logical proposition, for the relations of thought are entirely those of different degrees of generalization, and logical propositions answer only to these. Still, however, we shall understand better the strictly logical proposition if

we make a short examination of this proposition of identity. We shall find that, notwithstanding the emptiness of its form, it is of great importance.

A. — THE PROPOSITION OF IDENTITY.

The examples commonly given of the proposition of identity are such empty phrases as, *An elephant is an elephant*, and the like. It is evident, however, that the proposition is idle, except when the two elements of the proposition, though really identical, are yet different in expression. The proposition, *John is man*, is not a proposition of identity, for the two terms do not cover each other. John does not exhaust the possibilities of manhood, while, at the same time, he possesses attributes not essential to this. A complete definition of any object would approach more nearly the proposition of identity. In this the two elements, the definition and the thing defined, would seem, at first sight, to cover each other. Yet each point in the definition would be equivalent to a single logical proposition of which the parts would not cover each other; and, on the other side, it would be impossible to exhaust an object, save by a definition that should go into almost infinite minuteness. And even if this were done, the result would not be identical with the object itself, for it would lack the element of oneness or wholeness. It would be like the fragments of a watch when compared with the watch itself. It is evident, then, that the proposition of identity cannot exist in regard to concrete objects. We must seek it in a realm where equality

is identity. This would be a realm where only formal relations are regarded. This is the realm of mathematics. Because, when expressed in the abstract form, — *a is a*, — the proposition of identity is meaningless, we must seek its true use in those cases where the identity exists, but is expressed in different forms. Thus, instead of the formula given above, we may say, *x is a*, and because, in mathematics, identity is equality, we may adopt the mathematical formula $x = a$. If the statement that, in mathematics, equality and identity are the same, needs explanation or proof, these may be found in the fact that mathematics is the science of forms, and that it has one absolute expression for all similar forms. In number, one or twenty is identical with every other one or twenty. There is but one unit. So in weight. There is but one pound, it matters not whether of gold or of lead. As there is but one pound, every pound is identical with every other. The same is true of all other forms of measurement. The language of the vulgar is, in this respect, more philosophical than that of the learned, and has, besides, the authority of the cognate and philosophical German language. The rustic speaks of twenty bushel of corn, of five cord of wood. The critical man of education smiles contemptuously and says, bushels and cords. The rustic is theoretically right. No matter how often the measurement may be applied, there is but one bushel and one cord.

$X = a$ is, then, the formula for the proposition of equality, or the mathematical proposition. With this must be associated the corresponding propositions of

inequality, which are very different, it must be observed, from unequal propositions. These are thus written: $x > a$, and $x < a$. Within these limits mathematics as such is strictly confined, and from this it gains its unerring accuracy. It is the most accurate, because it is the most abstract, of sciences.

In the definitions of this science we find the proposition of identity. This is true of no other definitions. *A straight line is the shortest distance between two points.* This statement is not a logical proposition. Neither element is individual, neither is universal, when compared with the other. The two terms absolutely cover one another. There is no straight line which is not the shortest distance between the points. The shortest distance between the points is always a straight line. The definition includes also every element in the thing defined. It tells the whole story. It is thus a proposition of identity. The difference between the two kinds of propositions will be seen by comparing the one first given with this,—*The dog is a quadruped;* in this the two terms do not cover one another. There are many quadrupeds which are not dogs. Or take a more abstract definition of science: *A quadruped is an animal that has four feet.* Here the two terms do not cover each other. There is no animal which has four feet and nothing else. The term quadruped is abstract, while all animals are concrete. It may be said, indeed, that a circle has many properties not included in its definition. Very true; but you can construct a perfect circle, without other data than those contained in the definition, which sufficiency is true

of no other than mathematical definitions. In mathematics we have only abstraction, or, rather, there is no difference between the abstract and the concrete. Every straight line is at once abstract and concrete. This is true of the starting-points in mathematics, and, throughout, the propositions that involve any difference play a subordinate part.

What is true of the definitions is equally true of the axioms of mathematics. They are the most abstract and the simplest statements of the proposition of equality. It is because this is the science of equality, that it admits in so great a degree of axioms. The axiom, that the whole is equal to the sum of the parts, or that the whole is greater than any one of its parts, is involved in every mathematical proposition. We have already seen that this proposition is true only in the mathematical sense. It partakes, indeed, of the nature of a definition, almost as much as of that of an axiom.

The mathematical axioms are often taken as examples of self-evident truth. The fact is that they depend upon the perception of equality, and of this alone. They have their unerring accuracy, because the science deals with abstractions, and no disturbing forces can ever be introduced to mar the result. That power by which we say in any case, *always*, that is, by which we announce from any number of instances a general law, is not to be considered here. We have here to do only with that element which adds their peculiar accuracy to these mathematical truths, and which enables us to announce the law as certainly from a single case as from five hundred. It

is, I repeat, because in this science we deal with abstractions, from which every disturbing force is shut out by the very supposition. In any other science, a proposition as carefully guarded would be as self-evident and as universal. Thus the proposition that a body at rest will continue at rest, unless disturbed by some outward force or inward change, is axiomatic. Mathematics, as such, does not admit of reasoning. We may therefore consider, in this place, what answers to the process of reasoning in logic. The difference between the two will be clearly seen when we come to speak of the nature of the reasoning process. What answers to this in the mathematical science is only a continuation and succession of perceptions of equality. It depends upon these axioms, that *Two bodies equal to the same are equal to each other*, and, that *If equals be added to equals the result will be equal.* As is well maintained by Schopenhauer, we do not, in performing a mathematical problem, reason from the truth of these axioms; we perceive the truth of the relations they express every time afresh. As we had before a proposition of which the two terms were equal or identical, so here we have what answers to a syllogism in which the three terms are equal. The mathematical process consists in a series of equations or propositions of equality, so arranged that their elements are confronted at last in their simplest state, and the two statements which we wish to prove identical are shown to be so. Mathematics can thus discover nothing. It can demonstrate what is capable of such demonstration. The reasoning power must set an

aim before it, or it is useless. At every step in the mathematical process roads branch out in all directions; it is the reasoning power, not the mathematical, that determines which shall be taken. In other words, an almost unlimited multitude of equations can be formed. The end in view determines which shall be selected. Thus, if we wish to determine the relation of the angles of a triangle to one another, we subdivide the angles, we make new angles, we bring those together which we see to be equal, and, by this process repeated, we come at last to the equation which we seek, and discover that the three angles are together equal to two right angles. This last equation is not an intuitive perception. Taken by itself, it has no support from the perception of equality. All that this power of perception can accomplish is to affirm that the truth of each previous equation rests upon its necessary identity with the one before it. It may be, and very probably is, true, as is insisted on by Schopenhauer in his very brilliant and interesting discussion, that, at least by some minds, mathematics, including geometry, might be so studied and taught that not merely the necessity but the reality of the equality should be seen at every step. It is impossible to understand and account for the rapid processes of some mathematical prodigies by any other hypothesis. The truth is, however, that it is not so studied and taught at present.

When Newton demonstrated the great law of attraction, the reason had first announced it. To demonstrate it, he arranged a series of equations, till he had one which showed what is the distance which a body

as distant as the moon would fall toward the earth in a given time. By another series of equations, he found the distance which the moon approached the earth in the same time. He then united these two results in a final equation, which was the result sought from the beginning. The mathematician is like a man travelling through a strange country. Roads branch out in all directions. He knows the point of the compass towards which he is aiming, and selects road after road as it promises to lead him thither. Logic is *thought*. It is not an instrument of thought, but the process of thought. Mathematics is an instrument of thought. It is a sort of machine by which the crude and imperfect results of thought are taken and disentangled, and arranged in such a way that the thought can act upon them most readily. At the moment when the concrete realities with which thought busies itself assume the form of figures and letters, thought ceases. It does not begin again till these realities, purified, disentangled, and arranged, throw off the mask of figures and letters and assume their true form. What the table of logarithms is to mathematics, is mathematics itself to logic.

If mathematics is a machine, it is the most perfect, beautiful, and wonderful machine that the wit of man ever devised. We cannot enough admire the wideness of its sweep, or the unerring accuracy of its results. It is only when it would raise itself above thought, on account of this accuracy, or when it would set itself forth as the model or type of thought, that we must check its pretensions. It is accurate only because it is abstract. Strike out the fulness, the

concreteness, the manifold reality of thought, and it can be as accurate and unerring as mathematics. Introduce this fulness into mathematics and it is lost. It is like a hound that loses in the trodden road the scent of the footsteps which it has traced through the wilderness.

The glory, then, of mathematics is its accuracy. Its poverty and its weakness arise from its abstractness. Its accuracy, which is its strength, also depends upon this abstractness. This becomes a lack, only when it seeks to go beyond its proper sphere, as in the philosophy of Spinoza, where it would apply its method to the grandest and most concrete objects of thought. Within its proper limits, its abstractness constitutes its beauty and its perfection.

It must be carefully observed, that, in what has been said, reference was had, not to the mathematical sciences, but to the strictly mathematical element in them. There is as great a distinction between mathematics and the mathematical sciences as there is between induction and the inductive sciences. Practically, few cases of induction do not involve, to a greater or less extent, deductions; so few mathematical processes do not involve some strictly logical procedure.

B. — UNEQUAL PROPOSITIONS.

The absolute formula of the proposition we have seen to be this, *The subject is the predicate.* In the mathematical proposition this is strictly true. The subject and the predicate are absolutely equal and

identical. In the logical proposition we have already substituted for the formula thus given, this more perfect one, *The individual is the universal.* This is the type of every logical proposition. We have already left the simple truth and accuracy of mathematics. Our fundamental and typical proposition is false. The individual is not the universal. The universal stretches far beyond the individual. A single man does not exhaust the possibilities of humanity. A single animal does not exhaust the possibilities of animal life. From this springs all that is false and imperfect in thought and in the science of logic that corresponds to it. Instead of propositions of identity, we have unequal propositions. This difference is not temporary or accidental. The individual is not, and cannot be, the universal. As the glory of mathematics springs from its poverty, so the glory of logic, which is the science of thought, springs from the divergence and falsity which we have just contemplated. The elements of thought, the elements even of the proposition, do not stand fixed and lifeless, over against each other. Thought does not, like mathematics, have to do with dead and fixed forms. Thought is a living and endless process. In the divergence and falsity spoken of above lies the germ of this endless life. The individual is not the universal, but it *will* be. Logic is sometimes taunted with being a progress into the infinite. This is its highest pride. Thought rushes from step to step, from form to form, striving to subdue this great discord. It seeks ever to find the universal in the individual, to lift the individual to the universal. So soon as any

point is reached, after all its pains and labor, it finds the gulf as wide as ever.

This is not true of thought only, but, because thought is one with nature and history, it is true of these also. This, which is the moving power of thought, is the moving power of the universe. Everywhere there is the same breach, the same struggle. Everywhere the universal strives to shape itself in the individual, and everywhere, failing in its aim, it breaks to pieces its own work, and presses onward to new forms. Everywhere the individual strives to lift itself up to become one with the universal, and at every step is as far from it as at the first. In thought, this process comes to its consciousness. In logic, it finds its expression and its formula.

It is commonly thought that the proposition is the arbitrary bringing together of what is outward and distinct. The quality, it is fancied, exists loosely in my thought; the subject exists outside of me. By the proposition I bring the two together. This is not so. The subject divides itself into its qualities and various processes in order to sum itself up at last in the concrete unity of its being. Logic imitates this process. The proposition is the simplest statement of it. *The plant grows; the plant is green; the plant has leaves.* This is not my work, but nature's.

The great fault of the common logic, next to that by which it fails to perceive the great law of difference stated above, is, that it places all propositions on a level. It thus loses the very foundation of its own system. If the proposition be the expression

of a process, we must expect to find this process running through the proposition. Or if this be not so obvious at the first sight, the least practised thinker can see the great difference between such propositions as, *The rose is red*, and *The rose is beautiful;* between saying, *A horse is useful*, and *Self-sacrifice is noble.* Nothing shows the poverty of the common logic so much, or at least so clearly, as that all such propositions as these are classed together. They rest on entirely different bases. The proposition that quinine is a specific for the intermittent fever is the result of a very different process of thought from that on which rests the proposition that Raphael's painting of the transfiguration is a master-piece of art. There are three ways in which bodies may be regarded. The first is, as they present themselves directly to the senses. We may regard this phase of the object as its abstract individuality. Its color and form have no reference or relation, at least none that is obvious, when they are considered thus abstractly, to other objects. This, however, is not the only method of the existence of a body. It has manifold relations with objects about it. This is the next form under which it presents itself to us. We see it no longer in its abstract solitariness. Its being is divided among other beings. It has its system of action and reaction. But it does not lose itself in these relations. It has still its root in the common being. It has the end for which it was formed. This last constitutes its real and concrete being. This real being, this inner nature, by which it not only acts and reacts, but by which it *is*, constitutes the

third and highest form under which we contemplate it. This real and highest being we express by the words, Truth, Goodness, and Beauty. By these words, an object is taken out of the sphere of finite relations, and lifted up into that of the absolute relations, in which first it has its reality. We have, then, these three forms, each higher than the other, under which an object presents itself to us: first, its abstract individuality; second, its manifold finite relations; and, thirdly, its absolute *being*. These three forms depend upon the point of view from which we regard the object. They are dependent chiefly upon the degree of the development of our own nature. The change is more in us than in it. We first take in the world by the senses only, then the understanding begins to analyze, to observe, and to compare; and, finally, the higher reason sees the higher reality underlying all, and utters the verdict of true, or good, or beautiful. We have, then, a division based upon our own mental standpoint and development, which will be more serviceable than the first. The propositions answering to these three forms, in which objects are presented to the mind, may be entitled Propositions of the senses, or, more generally, of perception, Propositions of the understanding, Propositions of the reason. By the perception is here meant the faculty of the simple and direct cognizance of the outward world through the senses; by the understanding, the faculty which discerns differences, which discriminates, divides, and classifies, a classification being a method of division; and by the reason is meant the faculty which discerns the inner unity,

the fundamental and absolute relations of all. The lack of this distinction, and the neglect of the relations between these three forms of proposition, are the cause of much of the mistiness of our thought. Together they form the foundation of all our knowledge, the three tiers of the bridge by which we attempt to span the gulf that separates us from the absolute reality.

a. — PROPOSITIONS OF PERCEPTION.

These propositions are based, first, upon the testimony of each of the five senses taken separately; secondly, upon the combined result of these; and, thirdly, there is a large class of intermediate propositions which at first sprung from the understanding, but are afterwards confounded with the results of the senses. Such are the propositions which relate to the wholeness, to the individuality, to the distance, direction, size, etc., of bodies. These we commonly take as if on the evidence of our senses, while yet they are the result of long, though perhaps unconscious observation. The elementary books abound in examples of the utter impossibility there is, that one who has just gained the sense of sight can determine anything in regard to the relations existing in the world about him. Some such persons, when they become bewildered by the novelty of what they see about them, are forced to shut their eyes in order to find their way in any familiar locality. The relations of the senses, the circumstances in which, and the laws according to which, the senses

act, though of great interest in themselves, would be better studied in a work on physiology or metaphysics, than in one on logic. For us here is only to be considered the foundation that they afford for reliable propositions.

Of the five senses, two place us in relation with bodies in a state of dissolution or absorption. These are the senses of taste and smell. One other, that of hearing, brings us into relation with bodies that are in transient motion. We have, then, only two senses that bring us in connection with bodies in their integrity, and in their normal state. These are the senses of sight and feeling. All of our direct knowledge of the outward world is based upon these.

The revelations of sight are twofold: first, in regard to the color; and, secondly, in regard to the size and form of an object. The first we may call subjective, as the color, however influenced and caused by the body, is a sensation of our own. The second we may call objective, because size and shape belong to the object. Here is the great difference between sight and hearing, as putting us into a relation with the outer world. Hearing gives us the sensation of sound, sight that of color; but besides this sensation, color gives us knowledge of the form and the relative size of bodies. Thus the proposition, The rose is red, is true so far as the sight is concerned; while the proposition, that The face of the clock is circular, is objectively true.

It is commonly said that sight reveals only color directly. But sight does reveal directly the outline of forms. Even if we were without the sense of

feeling, all plane forms could be distinguished by the sight, and classified, just as colors are distinguished and classified. How distinct a consciousness of form we should have without the aid of feeling, it is impossible for us to say. We could not help noticing the difference between a square and a round patch of red. Thus we should distinguish between form and color, however vaguely. The sense of feeling gives reality to the perception of plane forms, and adds to this that of projected forms, and also of distance. By sight alone the changes produced by motion would also be discerned; but that any idea of motion would be attached to these changes is not probable. It would seem simply an appearance and disappearance of colors, like the play of iridescence on the neck of a dove. By the sense of feeling, we enter first the realm of full objectivity.

The way in which feeling, with the aid of the other senses, leads to the full knowledge of the outer world and its relations, has been of late discussed very ably by Bain and Herbert Spencer, and to their works and others similar, the reader interested in the study of psychology is referred. We have here to do, not with the delicate methods, but with the solid and reliable results of consciousness. I will, therefore, refer to views opposed to those stated above, only in regard to a single point. It was acutely argued by Brown, that even the forms of bodies exist to us only in sensation. We judge of the shape, of the size, of the hardness of a body, by the degree and kind of resistance which it offers to us. In this view he has been supported by Mill and other writers of authori-

ty. But this is only a partial statement. The form of a body is not recognized by our senses alone, but also by other bodies. Or, if one insists that we have a right to speak of things only as phenomena, we must recognize two classes of these. The first are in relation with one of our senses only. The second are in relation with more than one of our senses, and also with one another. The color of an object does not affect other insensible bodies, or, in other words, other phenomena pay no regard to it; while the form of an object is respected by other phenomena. Thus flowing water takes a sweep which answers precisely to the shape of the rock that opposes it. A ball rebounds from the wall that meets it. Besides this, form is recognized not only by one, but by two senses. These considerations force us to ascribe more perfect objectivity to form than to color. This is, perhaps, one reason why, notwithstanding the more varied power of painting, the feeling is so common that sculpture is the nobler art. The proposition of the perception, beginning with the direct effect of objects upon our senses, thus brings us at last to the relations of objects with one another, by which they become the material upon which the understanding works. Before, however, passing to the propositions of the understanding, we must tarry for a moment in the border land which unites, while it separates, the two.

There are many propositions, which, judging from our consciousness of them, we should say depended upon the senses, while yet we know that the senses alone would not have suggested them. These have been already referred to in the opening of this chap-

ter, but were left with the simplest notice. Here, first, can we give a full examination to them.

A man says that he sees a tree. The philosopher knows that he does not. He sees a certain form and color, which observation and experience, both unconscious, have taught him represent a tree. This is a difference between the senses and the abstract reasoning which will never be completely settled. Consciousness is on the side of the senses, abstract thought is on the side of the understanding. Custom and all the precedents of society are also on the side of the senses. A witness testifies to an act on the evidence of his own sight. If he gives his own inference about it he is checked. The court wishes to know, not what he inferred, but what he saw. It would hardly be taken into the account that his whole story is an inference; that what he says he saw he did not see, but only inferred from what he saw. What he saw was forms, colors, motions. What he inferred was a man doing violence to another man. This unconsciousness runs through life. The fact is, that what we see depends upon the standpoint which we have reached. A man's whole experience, culture, and development look through his eyes, and listen with his ears. Thus do the senses seem to gain new power at every step, and the progress is one which seems almost infinite. The chemist, the geologist, who sees the vastest laws of nature embodied in the smallest object or fact, would find it almost as difficult to separate the result of thought from the momentary act of the senses, as the poorest rustic would, who is sure that he sees men and trees. We

need not be careful in our divisions to settle these rival claims, to determine whether what perception has thus gained shall be considered as belonging to it or not, whether the understanding shall still retain any right over what seems thus to have passed out of its realm. It is enough for us that we have here the common border-line; and that, while discussing the propositions of the senses, we find ourselves already busying ourselves with those of the understanding.

b. — PROPOSITIONS OF THE UNDERSTANDING.

CLASS FIRST. — PROPOSITIONS OF GENERALIZATION.

The proposition, That horse is white, even the propositions, That is a horse, That is a tree, may be reckoned as propositions of perception, though this is done under some protest from the understanding. When we come consciously to generalize our observations, then the presence of the understanding becomes more easily and universally recognized. This distinctness is increased according to the vastness and difficulty of the generalization. If I say, All gold that I have seen is heavier than water, All the men of whom I have read in history were mortal, there is evidence of a comparison, more or less accurate, which all recognize as the work of the understanding. Yet the propositions rest for their truth on the evidence of their senses as much as the simple proposition, This bit of gold is heavier than water. No new element has been introduced except that of discrimination. When, however, I rise from such a generalization as

this to an absolute generalization, when I say not only, All the gold that I have seen, but, All gold is heavier than water; not only, All the men of whom I have read, but, All men are mortal, there is introduced a new element, which deserves our careful consideration. Before, the understanding worked with the senses. Now, it separates itself from them, and makes affirmations which have nothing to do with the senses. They are either out of the sphere of the senses, or they oppose the senses in their own sphere. This broad generalization, or rather this affirmation which goes beyond all generalization, is the aim of the understanding in all its lesser generalizations. It begins as an ally of the senses, in order that it may be able to set them at defiance. The senses affirm, as they always will, that the sun rises and sets. The understanding, which seemed to be the child of the senses, which suffered itself to depend upon them and to be led by them, returns and contradicts their most direct evidence. It bases itself on general laws, which are neither seen nor heard; and, more than this, pressing into the invisible future, and relying upon some unknown infinity, it affirms that these general laws shall endure forever, shall endure even if the material objects from which it seemed to have learned them should pass away. We have now to ask whether the understanding has power within itself to make such an affirmation as this. We are not now, it will be noticed, discussing the method of inductive reasoning, its rules and its safeguards; the question is only, what is the basis of all induction, upon what ground rest such propositions as, All men

are mortal, All matter possesses, always has possessed and will possess the property of attraction. They cannot be the result of observation, for they go beyond all observation. No analysis, not the clearest vision, has penetrated or can penetrate the time to come. No telescope can sweep the mysterious realm of the future. No observer has come to us to tell of its hidden wonders. Yet we speak as confidently of it as we do of what we have seen. It cannot be the result of abstraction merely, because it includes what abstraction can never reach. Abstraction separates from objects, in some respects unlike, some quality in which they are alike. But such propositions as those of which we speak, affirm these qualities to exist in regard to objects which we have never seen.

How do we cross this gulf which separates the seen from the unseen? At this point, different systems divide more than at any other. Hume, more logical in his scepticism than many others in their belief, affirmed the crossing to be impossible. We do not and we cannot reason, he tells us, from the known to the unknown. What appears such reasoning is, according to Hume, a mere habit of the mind. Belief is, according to Hume, mere vividness of conception resulting from association. We have been so often burnt, that we connect the feeling of heat with fire. We do not know that fire will burn us because it has burnt us, but the presence of fire suggests so strongly the thought of heat, that we call it knowledge. Thus does Hume, willing to accept nothing which is not part of his own conscious experience, lose that most important element of all experience, knowledge.

Thus does positivism tend to become unreal and negative. This criticism, however, furnishes no answer to the assertion that induction depends merely on association. We can decide the question with certainty only by observing whether association is sufficient, in every case, for the result produced. A man tells me, for instance, that a certain plant is poisonous. I go into a place where both this plant and a fire are perceived by me. I believe that this plant, from which I have never suffered, is poisonous, as strongly as I believe that the fire, from which I have suffered, will burn. With the plant I have no association of feeling, but yet I fear it. It may be said that, in this case, the association is with the spoken word; that I am used to expecting what is said to be followed by the result spoken of under the circumstances named. But I am not so used. I do not believe half I hear. All that can be said is, that, by induction, I determine what association to trust in, and what not. Thus association cannot be the foundation of induction. It may momentarily take the place of induction. When we do not think carefully, something that is suggested by association may be taken for something proved by induction. When we think carefully, we discriminate between the two, and often find the two in conscious strife. A man has met with an accident in driving, which makes him dread to get into a carriage. He may know, in any given case, that there is no danger, yet he cannot free himself from his dread. Now he may drive, in spite of the association; or he may not drive, in spite of his knowledge; but the strife shows that association is not

induction, and that induction is not mere association.

A more general statement of the same truth would be this: A strong impression on the mind is not the same thing as belief founded on induction. Such an impression may often be equivalent to such a belief. This may be seen in the training of a witness, which is said to be sometimes resorted to in preparation for a trial. Mr. A. meets the party to be manipulated, and inquires, carelessly, if he remembers a conversation which he (Mr. A.) had with Mr. B. in regard to a certain subject, when one said this and the other that, they standing in such a place, and the person inquired of at such another. The conversation may be further connected with some event that actually transpired. The man remembers nothing about it. A few months afterwards the same event is brought before his mind in the same way. This time he has a confused remembrance of the fact in regard to which inquiry is made. After a few more months, inquiry is made of him the third time. This time he remembers all about it, and, when he is summoned into court, gives fluent and circumstantial evidence. Now, such a case as this might, with some persons, readily occur. The detail of circumstances is surreptitiously introduced into an unsuspicious mind; their lines are artfully deepened, until, at last, the mind adopts it as the result of its own perception. The reason of this is, that whatever is thus impressed upon the mind, with no memory of the manner of its introduction, is apt to be the result of perception, and is so accepted without inquiry. The mind may be de-

ceived, just as the senses are deceived, but these exceptional cases do not prove what is the ordinary and natural method. The fact that whenever the method of the introduction of such an impression into the mind is recalled, this impression is strictly and promptly distinguished from the memory of an external fact, shows that the two rest upon entirely distinct bases, and are themselves entirely distinct. Now, the mere conception, before its origin is recalled, is no "*more vivid, lively, forcible, firm, or steady*" (to use the adjectives by which Hume would describe belief) than afterwards; yet in the one case it is belief, and in the other it is not. Belief, then, is something different from the vivid and steady conception of an object. Hume very properly affirms at the outset, that, "in philosophy, we can go no further than assert that *belief* is something felt by the mind, which distinguishes the ideas of the judgment from the fictions of the imagination." It is a pity that he undertook to take that impossible step by confusing this ultimate fact of belief with vividness in the conception of an object; though, had he not done this, the world would have lost his very interesting speculations, and all the rich discussion that has sprung from them.

Mr. Mill adopts still another position, startling in its boldness, and still more startling by its lack of foundation. He affirms, in effect, that faith in induction is the result of induction. Stated more fully and plausibly, the position is this: We arrive by induction at the grand proposition of the unity and invariableness of the universe. This is the great result of induction. It is the test and the proof of all minor

inductions. If I believe that the sun will rise to-morrow, because it has always risen within the memory of man, I appeal, in support of this belief, to the uniformity of the laws of nature. This last great proposition, the test of all and the proof of all, is left without proof or test, save the simple induction upon which it depends. To see the fallacy of this, we need only reduce this amplification to the simple proposition stated above, that our belief in induction depends upon induction. We have only to ask, upon what does our faith in this induction depend? The question is not to what broader induction may these minor ones be related, but why do we have confidence in induction itself? In other words, supposing that all the past in its fulness were known to us, all space familiar to us, and all time up to the present moment, and we knew that in every case, up to this moment, the laws of nature have been unvaried, what right would we have to say that they would be so in the next moment? This would be induction in its most perfect form, but why have faith in induction at all?*

If we look back on the ground that we have passed over, we shall see that the three positions, which we have successively occupied, are separated each from the other by a gulf which we can hardly bridge. We have, first, the impressions of the senses; we have,

* Mr. Mill, in his valuable critique on the Philosophy of Sir William Hamilton, appears to defend, in a note, this position in regard to induction, by saying in effect that many seem to forget the mutual support which propositions derive from each other. This should be forgotten by no sound mind. But this does not show that propositions may derive their only foundation from this mutual support. No relation of action and reaction would enable a man to sit in a basket and lift himself up by the handles.

secondly, the understanding busying itself with these impressions, not doubting that they represent real objects; and we have, in the third place, the thought going beyond the senses themselves, and stretching its results into that which is unseen.

The attempt to explain and justify these leaps, by the theory of certain innate truths, is at best an awkward one. It is not primarily by these innate truths that the transition is made. In other words, the consciousness of the truths, called innate, is developed out of the processes of mind which are said to rest on them, instead of being the conscious starting-point of these processes. I do not have faith in the stability and unity of the universe because I believe the proposition that the universe is a perfect and systematic whole. On the contrary, I deduce this proposition from the faith with which I expect in every case this stability. Still further, I do not believe from induction in this stability; for my faith in induction is itself based upon this other faith.

If, giving up all theory, and omitting nothing from our data because we do not understand it, we take the facts of our consciousness just as they are, we shall be able to simplify this whole thing. The truth of the matter appears to be that we come into the world with certain instincts of activity, bodily and mental, and a faith by which we follow these instincts, confident that they will not deceive or mislead us. As, however, the word faith may seem to imply too much a conscious foundation, we will use the term, *good faith*. Man comes into the world in good faith. By this is meant that he comes without

any feeling that he is to be imposed upon or trifled with. He takes it for granted, even without being conscious of it, that life is a real and earnest thing. In other words, he begins to live in good earnest. The infant has an instinct to suck. It knows nothing of the provision nature has made for its support. It simply sucks, in good faith, anything that comes within the reach and compass of its mouth. Now, this instinct in the child involves, in its truth, a very complicated system of facts and relations, the full knowledge of which is only reached by prolonged, and even professional, study. The child has further impressions and sensations. It takes it for granted that they mean something and correspond with something. As the child grows older, he watches the course of events, and so soon as he detects any similarity or appearance of method, he takes it for granted that that is the way that things are done here. This seriousness, earnestness, honesty, or good faith, whatever term we may apply to it, in which even the infant, in which even the brute, begins life, is the basis of the conscious faith in induction. It is the parent of the grand truth of the reason, that the world is a systematic whole, nay, that the universe is such a whole. The individual, meaning honestly and seriously himself, believes the world to be honest and serious. And, if this be so, it must have some meaning, some bond, some unity. In one word, the individual believes in the truth of things, and this implies, when developed to its full meaning, that they are not isolated shadows, but that they stand in a certain connection with one another.

We thus come to the propositions of the reason; but before entering upon these directly, we must consider another use that the understanding makes of the faith of the reason. Not only relying upon this does it reach new truth by induction, going forward in its undoubting march, it also arranges and classifies what it has already discovered. It makes its systems, not doubting that there is a great system which answers more or less accurately to them.

SECOND CLASS OF PROPOSITIONS OF THE UNDERSTANDING, NAMELY, THOSE RELATING TO DIVISION, CLASSIFICATION, AND NOMENCLATURE.

Classification may be made for two purposes. The first is, that of enabling us to find and recognize individual objects. The second, to form a system which shall answer to that of nature. In other words, the first is a help to the acquisition of knowledge; the last is a record of the results of knowledge. The formation of the catalogue of a library may illustrate the peculiar advantage and disadvantage of each method, and the incompatibility which sometimes exists between the two. A catalogue may be either an alphabetical list of the titles of the books included, or it may be what is called a "*catalogue raisonnée.*" In this last case a system is made embracing all departments of thought, and the titles of the books are arranged under the heads of this system. The first method enables one to find, directly, any book of which he knows the title, but exhibits nothing of the fulness of the library in any one

department, and is no guide to one wishing to read on a particular subject. The second method satisfies this last need, but it involves difficulty in finding individual books. One must understand, in all its details, the system adopted, or he will not be able to take the first step. Some books may belong as well under one heading as another, and in the case of complete sets of the works of a single author, either violence must be done to the method by bringing them together, or violence must be done to the sets by separating them. In the case of a library the difficulty is solved only by a twofold catalogue; but whether these are united, either serving, as it may, for the index to the other, or whether they are separate, the result is the same. It is, practically, two catalogues, as the two methods admit in this case of no compromise.

In the arrangement or classification of a science, the difficulty does not occur in precisely this manner, but the difficulty exists no less. It may be generally stated under this form. An arrangement on the fundamental principles of a science cannot, in general, be easily understood by a beginner in the science, and, further, such a classification cannot be made until these fundamental principles have been reached. The first classification, then, of every science is, and must be, popular. As the science advances, a new and more properly scientific classification may be made. Whether this ever becomes popular in its turn depends upon the obviousness of the principles of the science. We have a fine example of these two stages in the history of the

science of botany. The classification of Linnæus was sufficient so far as the cataloguing of plants, and the recognition of them, are concerned. But it was found not to fall in with the order and arrangement of nature. The *natural* arrangement is, in some respects, less convenient, but it exhibits its material in the order of nature. The importance of this last object of classification may be illustrated by the joy with which Hugh Miller found, or thought he found, that the classification of geology falls in with the order of creation.

All scientific classification, then, grows out of the science itself. That is, it is the result of observation. Strictly speaking, there is no such thing as a complete and absolutely *a priori* division. What is called such is a division which, from the laws of the mind, or from some known law of things, is seen to be final; but this law of the mind, or law of things, has been already learned by observation. Take, for instance, the classification of nouns already given under the heading *Terms*. Nouns may be the names of individuals or of classes, of materials, of qualities, of motions, or states. We know that we cannot conceive of objects except under these heads. The division is *a priori*, so far as the mass of nouns is concerned, but not so far as these possible conditions are concerned.

So far as any division is purely *a priori*, it is simply negative and thus partial. We see some objects possessing a certain quality, and we make a division distinguishing those that have this quality from those that do not. We seem to ourselves to say something when we divide objects into organic and inorganic.

This is, however, no proper division. It simply affirms that some objects are organized. Of the rest it affirms and knows nothing. We might as well say, Stones and other things, and call it a classification. When we take a step further, and divide objects into animal, vegetable, and mineral, we seem to have a more perfect classification. All that we have gained, however, is a subdivision of the one class already known, while the same formless and unknown mass of objects, before called inorganic, is now called mineral, — a term which has a positive meaning, it is true, but a meaning which has no reference to a great portion of the objects comprehended by it. Not until the science of mineralogy has become developed so that we know what are the common principles which unite this vast mass of things, as the principle of organization, either vegetable or animal, unites the first class, does it become really the basis of a scientific division. When we can say that mineralogy includes all objects which are subject to mechanical and chemical laws, and to these alone, and are capable of crystallization, we have what is the basis of a real and positive class. The title is popular, but the class is scientific. Either the laws of chemistry, or those of crystallization, or both, may furnish the positive characteristics of it. The result of all is, that a division is *a priori* only so far as it is in part negative.

We have then a classification which is based upon observation. We have examined, it is supposed, all objects sufficiently to find certain marks by which one group may be distinguished from another. Each group is not merely negative, but possesses certain

positive peculiarities of its own. This is the extent of most attempts at classification. It does not, however, satisfy the mental desire for completeness. We have thus far certain points, each distinct from the other, and having no relation to it. Each would be just the same if the other did not exist. What we now need is, a classification which shall exhibit the classes in their relation to one another, so that the whole shall not be merely exhaustive, but systematic and organic.

Of this form of classification that adopted by Comte for the arrangement of all our knowledge, and called by him the *Hierarchy of sciences*, is a very beautiful example. The basis of this is the greater or less complexity of the sciences. Mathematics is the most abstract of sciences, and forms the basis of the structure. Sociology, or the science of society, forms the culmination of it. Between these are ranged mechanics, astronomy, chemistry, etc. Each is more complex than the other, and as it gains in complexity it loses in accuracy and perfection. This is a very beautiful classification, for each class stands in its place as regards all the others, and the same test is applied to all. It is not merely a series, it is a hierarchy. It is, perhaps, small disparagement to say that this system is not perfect, in a sphere where perfection seems as yet unattainable. The reason demands not merely this relation of each to the whole, it demands also that this relation should be a fundamental one. It should be based upon what is really the vital point in each. If the assumption with which this system starts were true, that is, if we knew that

all other sciences could be reduced to mathematical laws, had we sufficent mental skill to do this, then the science of mathematics would be indeed the basis of all and the vital bond of all. The system would then be perfect. But this assumption is one that would be extravagant even in a work based professedly upon theory. It becomes doubly extravagant in a work which claims to be based wholly upon positive science. In the first part of this work we saw, indeed, that there is a point where quantity and quality become lost in one another, but yet neither can be confounded with the other. They are like the opposite arcs of a circle, which, prolonged, become lost in one another, but which yet cannot be confounded. So far as really positive science has yet gone, it is only the wildest theory to affirm that all difference in quality rests upon difference in quantity. Even if this were so, and proved to be, yet when this qualitative difference has once been produced, it brings with it its own system of laws, which cannot be confounded with mathematical laws. Even if we take a step further and admit, what we cannot deny to be possible, that science shall discover more and more the mathematical laws underlying all others, the hierarchy, though very beautiful, would still be imperfect. The principle adopted, instead of filling a more and more important place as we went on, would fill a less and less important one. Take, for instance, the science of society. It may be that it is the greater or less amount of vitality, or whatever else we may call it, which forms difference in character, yet it is the difference in character which must be recognized in

society. Such illustrations might be pursued further, but it seems sufficiently obvious that, after the differences in quality have been established, they form a basis of new laws. This must remain so, even in chemistry, where the mathematical laws have made such gains within a few years. Each substance has its own numerical equivalent, but the connection between this and the substance itself, with its varied qualities on the one side, and its compounds on the other, can never be unveiled. There will always remain these two elements. As we advance to the more complicated sciences, we have not only more complicated mathematical and mechanical relations, but also new qualitative elements which must always remain distinct.

Further, not only do the mathematical laws become connected with other principles, as we proceed, but they occupy more and more a secondary position. Instead of becoming more obvious and more important as we ascend, they become less obvious and less important. They do not, therefore, even if we could assume their presence as fundamental everywhere, become the best basis of division or classification. This should become more important and clearer as we advance, provided we have caught the true principle of nature. It is the lower that is to be explained from the higher, not the higher from the lower. Nature is, at least in form, a progression and an ascent. Class and system rise above class and system. The laws of life are higher than the laws of chemistry. The laws of chemistry, relating, as they do, to the nature of bodies, are higher than the laws of mechanics. This is

recognized by the very term, Hierarchy of sciences. But if mechanics has superiority to life, it is an inverted hierarchy. No principle of division or generalization can be complete or final which does not recognize this principle. The principle of division should, then, rather be a law than a quality or relation. It should be what might be called, formally at least, a principle of development. It should regard the lower from the stand-point of the higher, and not seek to drag the higher down to the level of the lower. This may be illustrated by some of the great generalizations of modern science, especially the science of morphology. The reduction of such different forms to a common type, the lower being viewed in the light of the higher, furnishes a beautiful example, or illustration, of truly scientific generalization. In the plant we have, in the progress of growth, the cotyledons of the seeds, the leaves, the branches, the flowers, and the fruit. All are modifications of the same structure, all are formed on the same type. Here, we have the image of the world, as the philosopher conceives it; all its manifold varieties being higher and higher manifestations of the same principle. The science of morphology goes further. It finds the same principle in the animal world that it found in the vegetable; the branching trunk is the prototype of the spinal column, while out of the spinal column spring varied members, all transformations of the same typical form; the skull itself being a transformed vertebra. Thus we have running through so large a section of the world a single principle; we have the higher springing out

of the lower. We make divisions, but they vanish under our hands. The varied parts and elements do not stand over against one another in stiff and stubborn opposition, but meet and flow into one another. We speak of leaves and flowers. They seem distinct enough; yet, as we look, we see the leaf structure becoming the flower, and the flower, in some play of nature, falling back into the leaf form. What we call divisions and elements, we find to be only *moments;* that is, the partial and complemental stages of an eternal progress. We cannot say that the flower or the fruit is only a variation of the leaf structure, understanding that it is only a chance play of forms. The flower and the fruit are the end of the leaf, in so far as it is the nature of the plant not to rest content with leaves, but to press on to its flowering and its fruit. More nearly just, though not strictly so, it would be to say, that the leaf is an *arrested development.* This is just, if we mean by the expression that it is a resting in one stage of an appointed development, understanding, also, that this resting is a part of the prescribed course. So it would be false to speak of man as a transformed monkey, or serpent, while in the same sense as the expression was used before, and without involving any theory of the method of creation, we can speak of these lower animals as examples of an arrested development; that is, only one stage in this great system, which is not complete, until it has reached the highest point of development in the highest of its elements. It is, therefore, evident, that no complete arrangement can be made, until the system is wholly understood and completed. Still we

can approximate this perfection. It may be possible to discover the law which controls this process before its whole sweep has been observed. This has already been found to be from unity to complexity, and from complexity to a higher and concrete unity. The terms applied by Mr. Herbert Spencer are as appropriate as any. The twofold law of differentiation and integration is the law of progress. Mr. Spencer has accumulated a vast collection of illustrations of this twofold law. This is, however, no different from what had been before announced as the law of progression through antagonisms. The growth of the plant from the simplicity of the seed, through the antagonisms of the upward-pressing leaves and downward-pressing roots, and of constantly dividing branches and roots, to the concrete unity of the whole plant, furnishes the universal type. We thus return to the logical basis. First, we have the abstract universal, next the antagonistic particular, and, finally, the concrete individual.

Physical science will approach slowly this perfection. Already the science of embryology is beginning to unite, by a certain principle of progress, the fixed orders of animal life. Already speculation is beginning to assail the fixed barriers of science. But it will be long before theory and the accuracy of science shall have settled these matters between themselves. Meanwhile the purely speculative sciences should reach after a more accurate and philosophic method of division. Mental phenomena succeed one another, and pass into one another, by fixed laws, and it is time that the mind should be no longer re-

garded, even in theory, as a mass of distinct entities. Hegel in Germany, and Spencer in England, approaching these matters from entirely different standpoints, have done much to bring about the desired result. The mind through all its phases is one. These phases are only fluctuating forms. Most of all, should logic, the science of sciences, attain to perfection of division and method. Yet nowhere else does such confusion reign as in the popular logic.

From what has been said above, it will appear that for any perfect classification, however general or specific, three things are necessary: first, that the principle of classification should be clear; that is, that it should be such as should enable us to distinguish certainly and accurately, members of one group from those of another; secondly, that it should be such that the divisions resulting from it should fall in with those of nature; that is, that the members of each group should be united, not merely by some arbitrary external mark, but also by some natural affinity; and, thirdly, that it should be such as to show the relation of each group to all others, whether upon the same plane, or upon a lower or a higher. It is interesting and instructive to see how science has gradually made her work correspond to these requirements, until now she consciously adopts them as the true ideal of scientific classification, and the test of its correctness. The science of zoölogy, for instance, we find assuming the form and proportions of a systematic whole, by showing that the members of the higher orders of any given class of animals pass, in the course of their development, through stages corresponding to those

occupied by the lower orders of the same class. One principle of division separates and unites all groups. The primary divisions, or types, depend upon plan of structure, "the classes upon the manner of its execution, the orders upon the greater or less complication of a given mode of execution, the families upon form," genera upon details of structure, and species upon minor differences in the details of the same structure.* The four general types of animal existence are arranged by Prof. Agassiz in perfect conformity with the principles above, and so often, referred to in this work, that is, of progression by differentiation. The radiates represent the lowest type; above these stand the mollusks and the articulates on the same plane, one representing concentration and contraction, the other representing outward expression; while above these stands the class of vertebrates. Thus we have three stages, the lowest representing the most abstract form of life, the highest the most concrete, while between them stand over against each other the two elements of life, the internal and the external. As we pass from these most general types, through classes, orders, families, genera, and species, we see one principle running through all, appearing in its most universal form in the first, and becoming more and more specialized in those that come after, until all together take concrete life in the individual.

The question of "Nominalism or Realism," which

*See the work of Prof. Agassiz, entitled "Methods of Study in Natural History;" a work as important to the student of logic as to the student of natural history.

was so long a subject of controversy among metaphysicians, or, rather, *the* subject of controversy which separated schools from one another, is thus being gradually settled by science in the direction of realism. The question was, whether names were anything more than words applied to certain resemblances or differences, which we observe in nature, the name of a group being merely a name with no reality corresponding to it. The facts of embryology show that at least the zoölogical orders represent a reality, the members of each being united by an inner unity as well as an outer resemblance. If the theory of development were true, science would become wholly realistic, each group representing identity of origin; that is, the continuance and activity of a single and special force; and, leaving this out of the account, all the approaches of science to a simple and perfect organization corresponding to that of nature work in the same direction, since they show in each group *identity of relation* to this common organism. Here, as in the matter of causation, it is beautiful to see the ease and naturalness with which science is gradually settling questions, which so long taxed in vain the strength of mere metaphysicians.

Terminology is a matter in which perfection is harder to reach, and less needful, than in division and arrangement. Words are only signs; and however accurately or inaccurately formed they soon pass into identity with the thing signified. It does not matter that the word *owe* once meant *to own*. No debtor's lot is lightened by that; and oxygen is as good a name, though the substance does much besides form

acids, and does not form all of them. Still, so far as it is possible, a systematic and accurate terminology is to be preferred. Chemistry, and a part of anatomy, approach more nearly to this than any other sciences; and even in these the perfection is in some sort mechanical. In other sciences, the division into classes, orders, genera, species, and varieties makes a sufficiently good framework for nomenclature. In mental science we miss, most of all, a scientific language. I will not here speak of the confusion produced by the use of terms half popular and half scientific; I will simply refer to the fact, that in forming the divisions of this work no such word as genus, species, etc., could be found to preside over the separate parts. Literary terms, such as Book, Part, Chapter, etc., have no organic meaning or relation. An argument has its terms, but for the consecutive unfolding of thought there are no terms. The figures and letters, by which the divisions in a work like this have to be marked, show how imperfect is still the culture of thought, which has not yet invented terms to represent its own various stages.

C. — PROPOSITIONS OF THE REASON.

FIRST CLASS. — PROPOSITIONS OF TRUTH.

We have seen that the propositions of the understanding, whether of generalization or of classification in its higher form, presuppose something behind them. Generalization cannot of itself pass into induction, and classification is based upon the fundamental principle, that individuals and species are

parts of one great system. The fundamental principle upon which these rest is that the universe is a connected and systematic whole. This is the fundamental proposition of the reason, and it is the foundation of all the reasoning of the understanding. To this, under one form or other, all the propositions that have been commonly regarded as expressing innate truths may be reduced. This itself, as has been already intimated, does not pre-exist full-formed in the mind. There is at first only the instinct of generalization and of trust in the truth and reality of things, which, as it finds itself not opposed, but favored by the outward world, reaches to fuller and fuller consciousness of itself. In this development it outruns at every step the results of the senses and of the understanding, until at last it reaches the perfect form which we have stated. Now that this is reached, we can see that it was involved in that crude and unformed faith of which I have spoken. Faith in our instinct of generalization is faith in the truth of things, in their reality, and in their mutual connection. Ever the simplest faith in outward reality involves the same truth. When we say that a thing is not real or true, we mean that it has no connection with what is about it, with what has gone before it, or with what comes after it. What we mean by the *being* of anything is this interpenetration of relations, which makes it a force and an object in the world. This connection, as has been intimated, is threefold. It looks first backward, and secondly forward, making of the object effect and cause, resulting at last in that conception which has been

well named Persistence of Force. It looks also, thirdly, towards all the surroundings of the object, culminating in the conception of the organic unity of all things. This last may be represented as giving us a simple circle, which the former, namely, the persistence of force, enlarges into a solid sphere. Since without this connection we could have no faith in the reality, truth, and stability of anything, this connection being what we mean by reality, truth, and stability, it follows that the grandest conception of the universe, as a complete and systematic whole, is involved in the simple good faith in which man begins his life. We may consider this trust in the reality of the outward world as an instinct, answering to the instinct by which the plant is fitted for its life, or by which one part of the plant answers to another. Man is fitted by it to be a part of this great organism in which he finds himself. To return to the illustration already used, as the infant lays hold of whatever offers itself, and puts it in his mouth, in the endeavor to suck nourishment from it, until it finds, at last, its instincts satisfied with its mother's breast, so the mind, by means of the instinct of generalization and induction, lays hold of the outer world in an unquestioning faith, seeking to draw truth from it. It mistakes often, but does not wholly fail of satisfaction, until at last it reaches the full comprehension of what this instinct means, and what is the truth for which it thirsts. Thus it is, that from poor and meagre data, it leaps to the conception and belief that the world is an organic, systematic whole.

By this instinct of generalization and induction that rests upon the good faith with which we begin life, and culminates in the conception of the organic unity of the world, we may receive some help towards understanding certain relations which are sometimes puzzling to the mind. Prominent among these is the relation of cause and effect. I have already given the scientific definition of causation, and in the same place remarked the unsatisfactory nature of the metaphysical definitions already given. Because there was no outward method of reaching the conception of cause and effect, Hume denied that we had such a conception, just as he denied, though as we have seen not without some self-contradiction, the fact of belief, as distinguished from mere association. Hume affirmed that all that can be meant by causation is invariable sequence. When one phenomenon invariably follows another, we speak of the first as a cause of the second. It has been well observed, in reply, that there is no sequence more invariable than that of day and night; yet day is not the cause of night, nor night the cause of day. Causation must, then, be something different from invariable sequence. Mr. Mill attempts to make the definition more perfect, by adding the word *unconditional*. Causation, he affirms, means invariable and unconditional sequence. The sequence of day and night is not unconditional. If the sun should not rise, night would not be followed by day; but the rising of the sun would be followed by day under all conceivable circumstances. The relation of day to the rising sun is, then, one of unconditional sequence.

This is all true, but what does Mr. Mill mean by *unconditional?* How does an unconditional sequence differ from an invariable one, except in the matter of causation? Why do we say that the rising of the sun is the unconditional antecedent of daylight, except because we know that the sun is the *cause* of daylight? When we then say, with Hume, that causation is invariable sequence, we make a definition that includes too much. And when we say, with Mr. Mill, that causation is invariable and unconditional sequence, we involve the very conception we would avoid.

The relation of cause and effect is one aspect of the relation of wholeness, which is the necessary object and condition of belief. Thus it will be seen that what we mean by the phrase cause and effect is the same relation in a consecutive form, that the relation of parts to their whole is in a statical relation. This relation of parts to their whole has its true significance in the fact that each of the parts has its true being only in the whole.

The relation of *identity* is another relation that it is difficult to conceive. Modern science has been continually substituting the word *similar*, for *the same*. Instead of speaking of two bodies as occupying the same relation to another, it speaks of them as occupying a similar relation. The nature of one man is not the same as that of another, only similar to it. Human nature is simply an expression for certain similar qualities found in different objects. Although the mind has hardly seen an escape from such statements, it has not been satisfied by them. They have

seemed to leave a gulf too broad, shutting off not only one object from another, but one atom from another. It has felt that such statements contravened the fundamental conception of truth. This sameness may be found in relation and function, if nowhere else. What is identical in bodies of similar nature is their place in the great organism. The relation which the position of one of the hands of a man in respect to his body bears to that of the other, is that of similarity. Their functions are identical, for the body is one, and the function of ministering to its needs is one and identical. So the function of each member of a class of bodies, so far as filling out the one grand organism is concerned, is identical with that of every other member of the same class; however much the relation of this individual member to the organic completion of its own class may be different from that of any other. These examples may serve to illustrate the light which the fundamental proposition of the reason, rightly understood, sheds upon the obscure questions of metaphysics.

Besides the power of the reason to affirm truth in advance of the testimony of the senses, and the generalizations of the understanding, it has another and stronger power. It affirms its own intuition in opposition to the testimony of the senses. In other words, in opposition to what is, it affirms what ought to be. In opposition to what the senses affirm to be true, it maintains an ideal truth. We say of a bad man, that he is not a true man. We do not mean by this, that bad traits are so exceptional to good traits, that they are opposed to our generic definition of man; but

that we recognize in the good traits what ought to be possessed by all men. We stand thus, not as theorizers, guessing what is; we stand as lawgivers, affirming what ought to be. We stand as judges, condemning or approving. This leads us to the second class of the propositions of the reason, namely, those which refer to the Good.

SECOND CLASS OF PROPOSITIONS OF THE REASON. — PROPOSITIONS OF THE GOOD.

Propositions by which we affirm the presence or absence of goodness imply a gulf which separates, or may separate, that which is from that which should be. They imply either a voluntary neglect of the true being, or a voluntary acceptance of it. These propositions have to do, evidently, with voluntary agents. In them alone can material for blame or praise be found, for they alone have the power to accept or reject this true nature.

The question which here meets us is, What is the basis of these propositions? The answer is, They rest upon one of the fundamental instincts of our nature, an instinct of action answering to the impulse of growth in a plant. The plant has its appointed form imprinted upon its germ, so that it cannot swerve from it, except under the pressure of outward circumstances. Man has, in like manner, the imprint of his destiny within him, only with him it is a matter of choice whether he will accept it or not. Sin, evil, these are the unnatural, and as such excite a certain horror. The impulse to good is the true im-

pulse of our nature, and hence the joy we feel in yielding ourselves to it. This description is, however, merely formal. We must now seek more directly the nature of this instinct, by which it is related to the instinct of belief, so that the propositions of truth and goodness belong to the same system.

The conception of truth implies that of the organic unity of all things. The instinct of belief is the undeveloped form of this. The moral sense, so far as our duties to the world about us are concerned, rests upon the recognition of this community between our own natures and the nature outside of us. Our duties to our fellow-men rest upon the recognition that their natures are manifestations of the same general life which fills out our own, as the different leaves on a tree are all filled by the same life; that this life is in them subject to the same conditions as it is in us; that it has the same needs and the same rights. The good man thus rejoices in the happiness of another as in that of another self; while the selfish man fails to recognize this community, and rejoices only in his own joys, and sorrows only in his private sorrows. This philosophical principle, first distinctly enounced by Schopenhauer, is the explanation of our moral relations towards our fellow-men.

The facts of history fall in with this view. So far as men recognize in others a common origin and a common nature, so far do they extend to them the kindly offices of love, generosity, and fellowship. We see this illustrated in the history of ancient Greece. The various families and clans had each a

distinct, divine origin. Individuals belonging to one were bound together by special ties of good feeling. These ties were somewhat weaker in regard to others of a different family, although this may have been also divine; while those outside of the limits of the connected families that made the nation were considered barbarians, without claim to the kind offices of life. It is remarked by Grote, that a suppliant obtained the right to kind offices and protection, by identifying himself with the family from whom he sought help. He sat in the ashes of the hearth, or otherwise made himself a sharer in the most sacred relations of home. The mediæval church believed itself full of the spirit of God. This was its life. It could see no reflection of this life outside of itself. Thus it felt no obligation, not even that of truth, towards infidels and heretics. In modern times, the oppression of the negro was felt to be unjustifiable, except on the assumption that he belonged to a distinct race, that he was not strictly human. The Christian doctrine of the common fatherhood of God, and the common brotherhood of man, places morality on the broadest basis, and prepares the way for that universal philanthropy in which each sees himself in all. The individual thus sees himself in other individuals of the same race. He feels that he has moral duties towards the lower animals, just so far as he perceives in them a life akin to his own, that has, like his, its sufferings and joys. He cannot, indeed, see himself reflected from the inanimate objects about him, so as to be impelled to kindly offices towards them, such as he would demand for himself. The

faith, however, in the oneness of the world, demands something akin to this. What he cannot do in respect to each he can in respect to all. Thus the nature which fails to find its conscious kindred in the separate objects of the world finds it in the Power which is within and behind all; and, itself a spirit, feels itself in relation and contact with the Infinite Spirit in whose life it lives.

We find thus the basis of the moral relations between man and man, and between man and God. He who violates these is either unconscious of them, or else he feels himself, by the violation, shut out from this common relationship, which springs from a common life. This feeling of severed connection, of isolation, unnatural exclusion, and banishment, is the punishment of injustice and wrong, so far as the moral sense is concerned, and the fear of it is the dread which works with the positive element before referred to, to enforce compliance with the dictates of the moral sense. In all this, nothing has been assumed or invented. The moral sense itself has only been reduced to its simplest form.

There yet remains, however, the virtue of integrity, which, standing by itself, has been found more difficult to bring under any common system. Integrity may be defended on the ground of utility indeed, yet it is not practised on that ground. We feel that we owe the truth to others, but yet more that we owe it to ourselves. Integrity has, indeed, a comparatively, though not an absolutely, distinct basis. In other words, it branches off very low down from the common trunk. It is simply the

obverse of the good faith which we found to underlie, and to be involved in, all our natural instincts. The instinct of acting in good faith is inseparable from even the unconscious expectation of good faith in the world. Thus the principle of integrity is bound up with the very first activities of the nature.

After this presentation of the true theory of the basis of morality, we will now notice, very briefly, certain false theories, in order to show their falsity, and then will return to the principle first enunciated, and illustrate its truth and its application.

The fault with most theories of goodness is, that they fail to reach the true and distinctive basis of it. Thus it is maintained that it is the command of God, which determines what is good and what is not. But this assumption defeats itself. It seeks to exalt God, but takes away the basis of this exaltation. If we are to love God because he is good, then it must be because he wills that which is good. If the simple will of God created goodness, then there would be no moral perfection in him. But, in the second place, this assumption does not meet the necessity of the case. It implies that I must submit to God, either on account of his omnipotence because I must; or else because, he being the Creator, it is *right* to submit to him. But submitting to a controlling force is very different from submitting to a moral law. A man often submits to force, while his moral nature protests against it. And if it be maintained on the other hand that the will of God makes right, because it is right that we should obey

the Creator, this presupposes a principle of right, upon which our obedience is based.

This theory is, however, little maintained at present, at least by thinkers. It is more common to base the moral law upon its utility to the community, or to the individual. If it be maintained, as it may very properly be, that an action is right because it conduces to the common good, we are obliged to take a step further, and ask why am I obliged to seek the common good. Here we need the moral law as much as in the action itself. To escape this difficulty recourse is had to my gain from the common good. I am a member of society. Whatever injures society injures me. It is wrong for me to lie, or I feel it to be so, because lying, if generally adopted, would strike at the very basis of every community, and I should suffer with the rest. But this would not furnish any sufficient basis for morality. You tell me I must not lie, because if everybody should lie I should suffer. You might as well tell me not to go over a bridge, because if everybody should go over at once the bridge would break, or some would be crowded off, — perhaps even myself; or that I must not drink of a fountain, because if everybody should drink it would become muddy. I have not noticed that general disposition to cross this particular bridge, or to drink of this particular fountain, that should lead me to shun either of them. So I have not noticed such a general disposition to lie as is implied in the prohibition, nor do I know how an undiscovered falsehood of mine should have any influence to produce this disposition. In a word, if

undiscovered, as I suppose the lie would be, it can have no effect upon the morals of society, while the present gain to myself from the falsehood seems certain. It is only a principle of honor that should lead me to refrain from what I would not have another do. It is the principle of doing as I would be done by, and this involves, and thus can in no way supersede, the moral sense.

Another method is, to account for the moral feelings by education, according to the circumstances under which it must necessarily be conducted. The child is born into a world in which it finds itself at once dependent upon others. These others, or, in other words, society will, at once, impress upon it those principles which are most convenient and essential to itself. Society, being a property holder, would impress upon it a regard for the rights of property. Society, depending upon the truthfulness of its members, would at once impress upon this new-comer the duty of truthfulness. The power of education is known so well that it need not be insisted upon here. This principle would account, in a large measure, for the different degree of moral culture in different places and times. Many of the historical facts referred to in illustration of the principle laid down as the true one could be explained equally well by this hypothesis. The more the interest of one community is separate from that of others, the less would its common spirit impress upon the new-comer regard for the rights of these others. This would account for the old method, unfortunately not yet altogether obsolete, of treating

foreigners as barbarians. As nations become more connected, the common necessities of all will mould the education of each, while those outside of this common bond will still be treated as barbarians; that is, the new-comer will not be taught to pay the same regard to them as to those of other nations. The fortunes of the Indian or the negro in our own land, the conduct of England in India and China, will illustrate this.

In fact, so very plausible is this theory, that we should be obliged to admit its force as unanswerable were it not for two considerations. The first of these is the pangs of conscience which follow the violations of commands held to be based upon the moral law, whether they have any real connection with it or not. No other teaching or habit excites a similar feeling when broken. There most, then, be some distinctive element which we call that of the moral principle. The second consideration is, that the instances of moral heroism, which we most honor, are those which transcend, perhaps even offend, public sentiment.

We have thus considered those theories of the moral law which base it upon the abstract, arbitrary, and absolute will of God, or upon the selfish interest of men. We have now to consider that theory which supposes the moral law to be written upon the heart of each individual. This is partially, and only partially, true. What is there is only a principle of action or of judgment. It does not tell what acts are good and what are evil until it knows what will be the history and effects of these actions. It would not

be wrong for me to strike another, unless I knew that the blow would give pain.

In our search for the basis upon which the propositions affirming moral decisions rest, we have thus reached a twofold foundation; one, the moral instinct which impels us to a certain end, namely, to seek the good of others as if it was our own; the other, experience, which tells us what acts tend towards this end.

It is not the purpose of this discussion to teach a system of moral science, but only its basis, and, in connection with what will follow in another place, the logic which should control the formation of moral science. For this end, it will be sufficient to look for a moment at the general relation in which we stand with our fellow-men. This relation is twofold, namely, of attraction and repulsion. The element of attraction we call love; that of repulsion constitutes the element of individuality. The attraction is the impulse of the reason, which feels the fundamental unity of all life. The repulsion corresponds with the understanding, which separates one life from all others. This twofold instinct teaches us to seek the good of others, and to leave them their freedom. Experience alone can teach us what is for their good, and how much freedom may be allowed to each, and at the same time the freedom of all be preserved. This is sufficient here to show us how instinct and experience are blended in moral science. After I have found what class of acts is conformable to this instinct, then I can enlarge this class without reference to this instinct. Here all those systems which

are based upon utility have their place. We may illustrate this by an example taken from another sphere of thought. In the science of music, it is *the ear* that determines originally what sounds are harmonious. The understanding, by its analysis, discerns what relation is essential to this harmony. When this is discovered, a musical system may be constructed without the aid of hearing. From this we may understand more clearly the twofold foundation of a complete system of moral science. The nature of this science will be considered more properly in another place.

The primary moral instinct is twofold. First, it is an impulse, and, secondly, it is a judgment. A true nature rejoices at the perfection of another nature. In part, this rejoicing takes the form of approbation, but there remains an element which is present in the contemplation of all perfection, whether moral or otherwise. Man is so much a part of the universe, that he cannot help rejoicing in all its varied perfections. As he rejoices in seeing human nature reach its ideal, that is, to see the idea of human nature perfectly manifested, so he also rejoices at every realization of every true ideal. That is, throughout nature, he rejoices to see the idea, which controls and strives to manifest itself, wholly triumphant. As there is the consciousness of freedom in the soul, when its bondage is broken and it has reached its ideal form, so there is a similar, though unconscious, freedom, in every triumph of the controlling idea throughout nature. This free idealization of the real, or this free realization of the ideal, we call Beauty. As truth

represents to us the abstract existence of things, and as goodness represents to us the struggle of the spiritual world to become what it should, or its voluntary assumption of its true nature, so beauty gives us this true nature with no mark of struggle or separation. We rejoice only in this complete perfection. We have, then, finally, in considering the propositions of the reason, to seek a basis for those by which we affirm that some objects are beautiful.

THIRD CLASS OF PROPOSITIONS OF THE REASON. — PROPOSITIONS OF BEAUTY.

The basis of propositions by which we affirm some objects to be beautiful is somewhat similar to that of those by which we affirm some actions to be good. They differ, however, both in the qualitative nature of the judgment, and in the extent over which it may be applied. The distinction between the moral and the æsthetic judgments is a matter of consciousness. The different circumstances in which they are applied is a matter of observation. The moral judgment extends to moral agents alone; the æsthetic judgment is not confined to the limits of any class. The moral judgment involves, as we have seen, the notion of obligation under pain of exclusion from the common life. The æsthetic judgment recognizes the free play, the uncontrolled spontaneity of the result which it contemplates. The moral sense is based upon the more or less clear recognition of our own nature in others, and urges us to live for them as for other selves. The æsthetic sense is based upon a vague feeling of the oneness between our own nature and that

of the outward world. It does not necessarily rise to the height of religious faith, to the perception of a conscious spirit in and through all things, though it may do this. More generally it consists in a sense of companionship in the outer world, and a sympathetic enjoyment of its perfection. The interpreters of the æsthetic sense are the poets; and it is remarkable that the most philosophical and the most passionate of our modern poets unite in the explanation of the sense of beauty which I have just given. Emerson, who, if he had written with a more equal hand, would have ranked with the highest of our later poets, who unites in a marvellous manner the mystical obscurity of the East, with the proverbial* simplicity of the West, a mingling of Hafiz and Franklin, writes, in his ode to Beauty: —

> "Is it that my opulent soul
> Was mingled from the generous whole;
> Sea-valleys and the deep of skies
> Furnished several supplies;
> And the sands whereof I'm made
> Draw me to them, self-betrayed?"

And Byron, in whom the passionate sense of beauty could hardly be expected to define, or account for itself, yet, by the very power of this sense, saw the relation between his own nature and that of the

* Hardly anything could better illustrate the truth to nature, of the poems of Emerson, than the fact that they are so largely quoted by Tyndall in his wonderful book on the Glaciers. While *litterateurs* found in these poems only subjects for derision, the naturalist found in them more truth and beauty than in any others.

outward world, on which the feeling of beauty depends, and uttered with a naïve simplicity a truth which philosophy could only reach by difficult thought. Thus, he exclaims: —

> "Are not the mountains, waves, and skies, a part
> Of me, and of my soul, as I of them?"

Wordsworth, who, to a sense of beauty as vivid as that of Byron, added a calm and religious contemplation, after having felt the wild rapture of that kinship to nature of which Byron sings, grew at last to a loftier and purer comprehension of what beauty in its widest relation actually is. Or, to speak more accurately, while Byron passionately, and Emerson reflectively, utter the secret of beauty, taken by itself, Wordsworth shows what it is in connection with a lofty religious faith. Thus he writes:—

> "I have felt
> A presence that disturbs me with the joy
> Of elevated thoughts; a sense sublime
> Of something far more deeply interfused,
> Whose dwelling is the light of setting suns,
> And the round ocean, and the living air,
> And the blue sky, and in the mind of man;
> A motion and a spirit, that impels
> All thinking things, all objects of all thought,
> And rolls through all things. *Therefore* am I still
> A lover of the meadows and the woods
> And mountains;" . . . .

Such is the explanation that Wordsworth gives of his love of beauty, after the first fiery passion of his soul had passed away. The enjoyment which he felt

in these more quiet years was not a contradiction of that experienced in the days of which he exclaims: —

> "The sounding cataract
> Haunted me like a passion."

The "dizzy raptures" of the earlier times were the enjoyment of beauty by itself. The calmer happiness of the later years was the coalescence of the æsthetic with the religious sense, in which each lost nothing, but each gained completeness. Neither surrendered anything to the other; each found itself in the other. I will thus content myself, in this case, with the testimony of the poets, as, in some former cases, with the testimony of language; poetry and language being each the simple expression, we might say the autograph, the one of the conception, the other of the æsthetic faculty.

But though the sense of the community of our own nature with that of the outward world is the basis of our sense of beauty by itself, it does not constitute the highest form of this. All mystics live in this sense of the oneness of all things. They find, vaguely or distinctly, companionship everywhere. The poetry and art of the Brahmins was a wild revel of mysticism. The same life was felt to be pervading all forms, and through this presence all were equal; yet we should not select these works as examples of beauty. As the ear may be too morbidly sensitive to sound to distinguish and enjoy music, so this mystic sense of the one presence in all things, of the identity of the inner and outer, may have such

morbid strength as to destroy the distinctions which are also requisite for beauty. The sense of beauty recognizes and enjoys, not everything, but the *perfection* of everything. This may be explained in either or both of two ways. It may be said, first, that in this perfection do we first come in contact with the reality of nature. Why should I enjoy all sound? Only in music do I come in contact with sound in its true nature and essence. In that, first, do I feel the presence and power of that outer reality, the expression of which sound is. Thus, in all beauty do we first hear the voice and see the lineaments of nature as she is, and recognize the life that is akin to our own. Or, it may be said, secondly, that, owing to our sympathy with the outward world, we rejoice in its freedom as if in our own; and the perfection of anything is its freedom. Probably these two facts together form the basis of our enjoyment of outward beauty, as it is controlled by the presence of what is called taste. It is taste which discerns this perfection, taste being the union of the discriminating power of the understanding with the intuitions of the reason. Thus the propositions of beauty involve the culmination of the intuitions of the reason, modified, as these intuitions should always be, by the discriminations of the understanding. If it be affirmed that the explanation of the sense of beauty just given is too mystical, I answer, that the hard, prosaic mind, that is, the understanding by itself, can make nothing of beauty and seems to have no sense for it; therefore, we should expect that the basis

of the enjoyment of beauty should lie outside the limits of the understanding.

We may illustrate this whole matter by the fact that the sense of beauty often becomes weaker in the more mature years of life. The more the understanding develops, and believes in, its sharp antitheses, and the longer and the more closely the mind is absorbed in personal cares and occupations, the more does life become a unit, cut off from the life about it. In youth this individuality is less fixed. The life of youth, fresh from the common fountain of life, its limits not yet sharply marked by the understanding, nor hardened by separate aims and personal cares, feels the community that there is between itself and the life about it. Youth is thus the age of *abandon*. It is the period of generous impulses and of self-forgetfulness. It forgets itself in the poetic passion of love, — a passion which is rather of the soul than of the senses. It forgets itself in nature. In forest, stream, mountain, and sky, it finds its other self, its completed being. The peace, the sublime repose, the unfettered freedom, which it lacks, it finds in them. In them, indeed, it finds its own moods and passions, but they are calmed and transfigured before it. It finds sympathy, but it is a sympathy that leads it out of itself. Thus it is drawn to them by a passion like that of love. This sense of the community of life is the "vision splendid" by which, according to the magnificent ode of Wordsworth, youth is "on its way attended." As the understanding grows sharp in its discriminations, and preponderates over the intuitions of the reason, the

mind loses this consciousness of this relationship to the outward world, of which it can find no justification or explanation. The sense of personality, as it preponderates over the sense of unpersonal life, takes away more and more the possibility of this consciousness. Thus the man perceives this vision

> "die away
> And fade into the light of common day."

In this aspect, the life of the poet and artist, as well as that of many a childlike man and woman, gifted with insight though not with utterance, is a perpetual youth. Thus, also, the best age of Greece represents the youth of the world, — behind it, childishness; before it, the maturity of self-poised, self-conscious, and self-limited manhood. To sum up our result in general terms, I should say that the propositions of beauty do not affirm merely abstract being, like the propositions of truth. They do not recognize an actual or possible divergence between what is and what should be, like the propositions of goodness. They recognize the free and perfect manifestation of that force which constitutes the nature of each object, and by which it is kindred to all other objects. In other words, it is the idealization of the actual, the triumph of the idea which forms the substance of each thing, or of all things.

We must now illustrate the view just presented, by a glance at the various spheres of beauty. I regret that the survey must be very brief, merely sufficient to show the objective basis on which these prop-

ositions rest, and their relation to the other propositions of the reason.

The lowest manifestation of beauty is found in the melodious and harmonious arrangement of sounds, and what is akin to this in the relations of colors and forms. We here see what is meant by the expression just used, the free idealization of the actual. Sounds, as they are uttered at random, are subjected to the conditions of the material objects by which they are caused. A musical sound is a pure sound. It is the result of a succession of undulations of equal length. A mere unmusical noise is an impure sound. It consists of musical undulations thrown together at random. It is no sound, properly so called. It is a confused sequence of broken sounds. Harmonious sounds are those, the length of whose undulations have a certain correspondence, so that the waves of the one do not break up, but fall in with, the waves of the other. Harmonious sounds thus conform to the principles of sound itself, and are independent of other conditions. Music is a stripping away from sound all foreign, restraining, modifying influences, and suffering the sounds to group themselves according to their own law. Our own natures are so in harmony with the outward world, that we rejoice in this free play and natural combination of sounds, as if we, also, were made free by it. Or, as above intimated, in melody and in harmony do we first meet pure sound, that is, sound as such.

What is true of sounds is also true of colors, and other specialities of the different senses. Had we space it would be interesting to see how, throughout nature,

this free naturalness, or harmony, is constantly struggling to manifest itself; in other words, how naturally sounds and colors flow into this harmonious relation. We have now only to contemplate the recognition of this result by the reason.

Mere sounds and colors are in themselves, however complete and harmonious, merely the form for the expression of a higher beauty. Harmonious sounds are ideal sounds, that is, they exhibit the natural relation of sound. There are, however, higher ideals, which are to realize themselves. Passing over lower forms, we shall find a good illustration in that of life. A living object is beautiful, first, so far as it is the free manifestation of life; and, secondly, so far as, at the same time, it makes use of the harmonies of form and color. What makes some living creatures appear ugly and deformed is that the free play of life seems obstructed in them. Life, being a principle of unity, seeks unity of form, ease of motion, correspondence of parts. The more variety of part, other things being equal, the greater is the triumph of this principle of life. Any creature which is clumsy or misshapen, in which the different elements are without subordination, or in which they are unduly separated from one another, excites various degrees of disapprobation. In the human form, the ideal of life is fully realized, first, on account of the harmony of the parts; secondly, because the mask of concealing fur, in which the lower animals are wrapped, is cast aside, so that the free play of life is unconcealed; and, thirdly, because the position of man, being more opposed to the mechan-

ical tendencies of bodies than that of the lower animals, every motion requires and displays the presence and power of life. But every human form is, in some way or other, imperfect. It is to art, then, that we look for the full exhibition and idealization of life and its forms.

In man life has reached the higher form of life and sentiment. We have now an ideal which is conscious of itself, and in the realm of art we have a higher object than the mere manifestation of life, namely, the embodiment of the highest thought and idea of man. The race seeks to make its ideal real before it. This ideal, or highest thought, will vary with changing times. The race being a whole, its progress being a growth, the highest thought of every age will exhibit the point reached during that age, and when compared and brought together with the highest ideal of other times, will, with them, form a whole, as complete as the history of the race. Art is the embodiment of this ideal; consequently in the study of æsthetics we have an element introduced which did not meet us while speaking of the moral principle, namely, that of historical succession. The morals, so far as they are complete, have no dependence upon the past. What is right at one time is always right, and is complete in itself. Duties vary, it is true, with changing circumstances; but the principle remains the same, and the duty of to-day is complete without that of yesterday. It is not so in art. Art is a historical development, the products of which are enduring, and are necessary to make the whole complete. The noble deeds of antiquity are re-

peated, when there is call for them in our own age; but the time is gone when the Iliad could be written, or the dramas of Æschylus and of Sophocles. The time is passed when the Apollo of the Belvidere could be wrought in enduring marble, when the Madonnas of Raphael, or his Transfiguration, could be painted; and the gorgeous cathedrals of the middle age were the growth of a time that is gone by. Yet we need all of these, we need even the symbolic creations of far earlier times, we need the Sphinx and the Pyramids, to give us the whole of artistic beauty, — a whole in which all the parts have the closest relation to one another, and to that future art, which will do its portion towards the completion of the great whole.

If the various products of human art together make up the completeness of artistic beauty, what must be the beauty of that great whole which includes the universe! This, we must believe, is the outgrowth of one vast idea, one perfect ideal. Observation, science, intuition, reveal to us more and more of this completeness. It involves all the relations of worlds, of life, and of histories. This grand idea, which seems to us to be infinite, revealing itself in the structure and progress of the whole of creation, is the perfect beauty, of which what we discern is but a minute part. But still the thought of what beauty is, in its completeness, reveals to us something of the nature of beauty wherever it is found. It is the perfect manifestation in any object, or group of objects, of that idea which forms their life and being, and

which is only a fragment of that infinite idea of which the universe is the embodiment.

C.—MEDIATED PROPOSITIONS.

We have thus passed in review the various forms of propositions, with the bases upon which they rest. The three bases, so far as our mind is concerned, are the perception, the understanding, and the reason. The examination has shown how distinct these are. But while it has shown their distinctness, it has also shown their dependence upon one another. There could not be a proposition, even of perception, without the help of the analyzing and dividing understanding, together with the faith of the reason. There could be no proposition of the understanding, which would amount to anything more than a generalization of particular phenomena, of all of which the senses had taken cognizance, without the aid of the reason, which gives authority for the enlargement of these generalizations into inductions. And the propositions of the reason, even if they could be formulated, would be abstract and barren, without the aid of the understanding. Besides this general relation, there is a special one between the propositions of each class among themselves. Nearly all propositions of the understanding involve previous propositions. Thus we reach the idea of mediated propositions. If I look at the flowing tide, and say, This movement of the water is caused by the moon, the proposition would be without force, unless I could give a reason for it, or unless my reputation for scien-

tific knowledge would give authority to my statement. In this last case it would still be supported by some mediation. The listener would repeat it, saying, It is so, for I heard a man assert it who knows all about such things. If I were appealed to, to support the statement, I should be obliged, myself, to put it into the form of a mediated proposition. The movement of this water, I should say, is caused by the moon, because it is the tide, and tides are produced by the moon. If I were still further questioned in regard to this last statement, I should have to put that, in turn, into the form of a mediated proposition. I should say, We know that tides are caused by the moon, because a great many observations unite to show that there is this relation between the tides and the moon, while theoretical science shows that this relation must exist.

The first proposition — This movement of the water is caused by the moon, because it is a tide, and tides are so produced — gives us the simplest form of this mediation. It will be remembered, that the formula of a proposition was found to be, with some modifications, this: The individual is the universal. Thus, in the proposition, This movement is caused by the moon, the movement is the individual object, while the influence of the moon, with its manifold effects, is the universal element. In the mediated proposition, the particular was introduced to fill up the gulf between the individual and the universal, and to bind them together. The *particular* element in this case is the tide. This is a tide, and all tides are caused by the moon. Expressed in its fullest and clearest

form, it would read thus: All tides are caused by the moon. This is a tide, therefore it is caused by the moon. Thus we find ourselves already having to do with the syllogism. The mediated proposition is technically called an enthymeme. The syllogism is the developed enthymeme. The enthymeme is the abbreviated syllogism. As the real relation of the elements of each are the same, I shall sometimes, for the sake of simplicity in discussing the syllogism, use the enthymeme in its place, as is commonly done in actual reasoning.

THIRD.—PROOF AND SYLLOGISMS.

In studying the nature of logical terms, we found that, practically, each term, though called universal, or individual, was, in strictness, a mingling of the two elements. Every term implies a universal idea, limited by a particular or individual use. Thus the word *brown* may be called a universal, or, more strictly, a particular term, expressing, as it does, an abstract color. Etymologically, however, it contains the general notion of burning, limited to a reference to the color produced by burning. For convenience, we will take a term obviously compounded. Logically speaking, the words, A happy man, form a single

term, as much as the word Wine-glass, or the word Glass, itself, which last is merely a modification of a more general term, meaning to flow, its direct reference being to the melting process by which glass is formed. The words, A happy man, then, may conveniently stand as an example of a logical term. The proposition separates the elements of these terms; it leaves them standing over against one another, thus: The man is happy. It affirms the relation, but leaves it as a mere affirmation. The syllogism, introducing a third term, brings these two elements together into a closer union than before. It changes affirmation into proof, or at least shows the foundation and necessity of the relation, as when we say, The man is happy because he is virtuous. If we represent these three elements, the universal, individual, and particular, by their initial letters U, I, and P, the formula for the term, the proposition, and the syllogism may be thus written: —

Term, I U.
Proposition, I—U
Syllogism, I P U.

This last formula needs further analysis and explanation. Changing our example for another, we will take this, which has often done service as a model syllogism: All men are mortal. John is man; therefore John is mortal. Here the universal term, mortal, and the individual term, John, are brought together, by means of the common particular term, man, as in the formula above written, I P U. These letters, it will be seen, may stand in three

relations to one another. Each one may in turn serve as the middle and uniting element. Thus we may have: —

I P U, P I U, and I U P. These represent the three forms of the syllogism. In the first the particular, in the second the individual, and in the third the universal, serves as the uniting element. We thus see that there must be three forms, and three only, of the syllogism. We see further, that the relations of these forms to one another is organic. An examination will show that each has its own place and office. The two last are not merely to be changed to the first. They are as essential as the first. We took, as an example of the first form, this syllogism: All men are mortal. John is man; therefore John is mortal. The result is obvious and certain, if we are sure of our premises; but the question remains, how can we be sure of these? The first premise is, that all men are mortal. How do we know this, and how can we prove it? Only, certainly, by reference to individuals. Every man, of whom we know anything, has died before he has reached a certain limit. Thus, the particular term, men, and the universal term, mortal, are brought together only by a series of individual terms. The second premise, John is man, requires similar proof. How do we know that John is man? Only by bringing together the universal qualities that belong to humanity, and showing that John possesses these. John is man, because he has reason, etc. Thus are the individual and the particular united by the universal, in the third form of the syllogism. The first form of

the syllogism represents the process of deduction, the second that of induction, and the third I will call identification. These three together form a triple cord, which cannot be broken, and each is needed to complete this cord. We shall proceed to consider each somewhat more in detail. It will be noticed that, in accordance with the arrangement of Hegel, the second form of Aristotle is here called the third, and the third takes the place of the second. The organic relation of the three requires this. As the forms of the syllogism were left by Aristotle, they stood in no vital connection. Their order was therefore of no importance.

FIRST FORM OF SYLLOGISM.

DEDUCTION.

Mathematical reasoning is sometimes supposed to belong in a special manner to the field of deduction. Indeed, mathematics is sometimes regarded as the only true example of deductive reasoning. This idea is referred to here, only that it may be removed from our path. The truth is, that although deduction plays an important part in mathematical processes, mathematics, as such, has no special connection with this form of reasoning. What is peculiar to mathematics is not reasoning at all, but a perception of equality and difference. The equation is the formula of mathematics from beginning to end. The error of including it under the head of deduction is similar to that by which Sir William Hamilton maintains that the only true induction results from a study of

all the individual examples included in the generalization. This is not reasoning at all. If I say I have examined thirty specimens of a certain substance, and these have all certain ingredients, this is not reasoning. It is only a summing up of a certain number of instances. The result is not an induction, it is an equation. The equation belongs to mathematics, and by itself has to do neither with induction nor with deduction. Deduction is the passage from the universal to the individual, by means of the particular. A certain inequality is thus present at every step.

The formal elements of a deductive syllogism are three propositions. Of these, two are called premises, and the third is called the conclusion. One of the premises, being in its nature more general than the other members of the syllogism, is called the *Major premise*. The other, being more limited, is called the *Minor premise*, and the third proposition is called the *Conclusion*, and is, at least when compared with the others, an individual proposition. The abstract formula of the deductive syllogism is this: The particular is the universal; the individual is the particular, therefore the individual is the universal.

We thus reach the elements which we have before seen to be the real and fundamental elements of the deductive syllogism, namely, three terms, the first, relatively a universal, the second a particular, and the third an individual. These three terms are, indeed, common to all syllogisms, but in deduction the universal and the individual are the extremes, con-

nected by the particular, according to the formula — U P I.

Deduction is regarded as the most certain of all reasoning. Indeed, if the premises be true, and their relation to one another be complete, there can be no error. It will be seen at a glance, however, that these ifs are very important. They will show us just what we should be on our guard against in all cases of deduction, namely, first, that we do not reason from false premises; and, secondly, that we do not reason from premises which have no logical relation to one another. To insure the proper relation between the two premises, it is enough that one be broader than the other, that the subject of the first be the predicate of the second, and that this common term be used in both with the same meaning. If the premises be true, and their relation such as has been described, the conclusion will take care of itself. There can be no rules for deduction, except those that regard these points, which may be called preliminary. To give rules for deduction is like giving rules for firing a gun. You teach how to load the gun, and how to aim it when firing. These two points are like the premises, and their combination in deduction. In firing, the ball will take care of itself. If the charge and the aim be right, it will hit the mark. This is like the conclusion of a deductive syllogism. Take care of the premises, and the conclusion will take care of itself. Although the process of deduction is thus simple, abstractly considered, yet it has given rise to much difference of view, and many animated discussions, and is practi-

cally beset with certain difficulties, to which it is necessary to give some preliminary attention. Especially have thinkers differed in regard to the place that should be occupied by deduction. Some have held it to be the only form of reasoning. This was, in a special manner, the view of the elder logicians. But its importance, once exaggerated, has been of late underrated. It has been urged against the deductive syllogism, that the first proposition involves all the rest, and that thus nothing is gained by the process. Take, as an example, the common and commonplace illustration often given: All men are mortal. John is man; therefore John is mortal. Now, it is urged, when in uttering this syllogism I say, All men are mortal, I have already included John in the statement. It must be admitted, that this objection has a basis of truth. But, first, it must be considered, that deduction is, as has been already stated, only one step in reaching the final result. The two premises have been already established by previous reasoning, according to the method of the second and third form of syllogism. It was one of the weaknesses of the old logic that it omitted this fact. Placing the first form of the syllogism alone, except for partial and negative uses, and naming it reasoning, it made it appear weak and barren.

But, in the second place, we must be careful not to underrate the importance of the difficulty of bringing the two premises together, and thus making obvious the conclusion that springs from them. The two propositions may have existed long in the world,

framed and recognized, yet it may be only a stroke of genius, or accident, that has brought the two together. Thus it was known that light would produce changes of color in certain chemical substances, according to the intensity of the light. Also it was known that every object, the human face, for instance, radiates from every part light of greater or less intensity. In these two propositions, we now see to be involved the whole theory of photography. Yet for a long time it occurred to no one to bring these two premises together, and reach this conclusion. So, also, it was long admitted in general that men could look out for their own business better than others could for them; and, though it was also obvious that government is a part of their business, yet few, or none, brought the two propositions together, so as to exhibit the grand result that the people can govern themselves better than others can govern them. The difficulty in these cases, and in multitudes that might be cited, is, that we form a habit of looking at our conceptions in groups, as they are commonly presented to us. Truths that, if brought together, would be seen at once to be the major and minor premises, from which is evolved some new discovery, being thus bound up each in a separate group, are not seen in their true relation to each other. It requires a certain genius to disregard these habitual associations of ideas, and see things in their purely logical aspect. In the first of the examples named above, the fact that light would produce changes in the color of certain chemical substances was considered in its relation to other chemical truths.

The radiation of light from all bodies was seen in relation with optical truths. It needed either a lucky chance, or an intuition of genius, to bring the two together. It is this fact that makes it so difficult in many cases to determine just where to put the credit of a discovery. The truth seems to be involved in statements made previous to the discovery. We cannot now see those statements without perceiving them to be the premises containing the whole secret. That is, these truths have now entered into new groups, from which we cannot disentangle them, and it is very hard to realize that they did not suggest, from the beginning, all that they now suggest to us. The difficulty referred to, namely, that of separating allied truths from the groups in which they accidentally find themselves, is increased when the prejudices or interests of persons would be affected by the change. Here not only the force of habit but these stronger influences oppose the logical process. Thought needs a pure medium. Even a solution of any salt needs quiet and freedom from outside influence to deposit perfect crystals. Thought is a sort of crystallizing, and any outside and disturbing influence may hinder or prevent it reaching its perfect and natural result. This is the reason that religious, moral, and political truth makes such slow headway. So many interests, and so many prejudices make a thick and turbid medium, in which the fine elements of thought are hindered from grouping themselves into the logical form, which is their crystallization. From what has been said, will be seen the futility of objections made against the syllogistic

formulas, because the starting of each one of them contains already the entire process within itself. It should be remembered that the complete syllogism is the completed argument. The forming syllogism is the forming argument; and we have shown the genius and the good fortune which are essential to this formation.

There is another difficulty that is involved in the practical use of the syllogism of deduction. It is this: that all general truths, except those that are absolutely abstract, have more than one side. More than one train of reasoning can be evolved from each; and these separate trains are liable to lead to different, and even to opposing, results. We have, also, examples of two truths, each of which is regarded as absolute, though they may be opposite sides of some one more comprehensive truth. These may give rise to distinct lines of reasoning, each well founded in its starting and guarded in its course, while some of the results of each may be directly opposed to those of the other. This antagonism between the results of different lines of thought, each of which is, so far as can be discovered, without flaw, is called an antinomy. It is not accidental, but is involved in the very nature of deduction. It will continually meet us in our study of the special forms of deduction; therefore, I shall not further explain or illustrate it here.

We will now consider the nature of deduction, as affected by the nature of the fundamental proposition, which may serve as the major premise. This proposition may be one of two sorts, namely, prop-

ositions of the reason, and propositions of the understanding. The first class of propositions discussed above, namely, propositions of perception, cannot, it is easy to see, serve as either major or minor premise. Propositions of perception * are, by their very nature, individual. Not till they have been generalized by the understanding are they fitted for the purposes of deduction. Besides premises based directly upon the reason and upon the understanding, may be reckoned those which derive no perfect support from either, but a partial support from each. By these are meant hypothetical propositions, which have no certain foundation, but which, if they are not entirely random and foolish, must be based upon intimations from these two sources. The hypothesis also forms the natural transition between deduction and induction, being an imperfect example of each. We will now consider the nature of deduction based upon the propositions of the reason.

A. — DEDUCTIONS BASED UPON PROPOSITIONS OF THE REASON.

In discussing the propositions of the reason, we found that they consisted of three classes: the first

* In the arrangement of propositions in regard to a single object, the proposition of perception stands as the universal since it gives the abstract form into which all other knowledge in regard to this object is to be introduced. But in reasoning to other objects, we can take these separate perceptions only as united in a mass, as in induction. For deduction, we must take, as best representing the universal, the broad and all-embracing intuitions of the reason.

relating to truth, the second relating to goodness, and the third, to beauty. They were based, as we found, on the good faith in which we look upon the world in which we live. We take it for granted, that what surrounds us is real. This reality we find, later, to involve a certain necessary relation between all things. The same good faith, which, at the starting-point of reasoning, requires us to believe the world to be real, later, requires us to believe that it is a systematic and organic whole. By our very nature, we recognize a gradation in our estimate of the qualities of things. We recognize goodness as the highest of these qualities, and the same trust and good faith, which makes us believe the universe to be one organic whole, makes us also believe goodness to be the ruling power in the universe. We feel that, without goodness, our own life would be a failure, and, in like manner, that, without it, the universe would be a failure; but this, the good faith of which we have spoken, will not allow us to believe. What is true of goodness is also true of beauty. The universe is perfect, and beauty is another name for perfectness. Our developed reason, then, aided, it is true, by the inductions of the understanding, yet superior to and broader than these, and furnishing their very basis, recognizes truth, goodness, and beauty, as together the rulers of the world. It affirms absolute truth, absolute goodness, and absolute beauty. There cannot be three absolutes, therefore these three, each taken in its completeness, are one. From these all begin, and with them all end. This is the *a priori* proof, or recognition of God. The universe is

one. Goodness is as absolute as truth. This proposition introduces the moral element into our thought of the infinite *One*. Beauty is absolute as goodness and truth. This proposition adds to our thought of the infinite and good One, the brightness of glory. Truth, goodness, beauty, these are the beginning; these, also, shall crown the close. The universe shall be one whole. Goodness shall have formed all, and the whole shall be perfect in beauty. The beginning of rational existence recognizes dimly these truths. The developed reason recognizes them more clearly. Our clearest intuitions, in our best moments, affirm them most certainly. We may argue against them, but the true mind returns to them again, as we return to our faith in the senses.

In the reasoning referred to above, each of the terms, truth, goodness, and beauty, plays, by turn, the part of the individual, the particular, and the universal. The syllogism resulting would be after this form: The absolute is the perfect truth; goodness is absolute, therefore goodness is the perfect truth. Thus each, in turn, would be found equivalent to, and identical with, the other.

The fallacies in this form of reasoning, from one of the propositions of the reason to another, begin, when, instead of taking them in their broadest sweep, we take them partially, and attempt to prove their identity in their minute elements. This is the common method of error in deductive reasoning, and has done much to bring it into disrepute. The difficulty of reasoning of this kind is, that we fall into an antinomy, which is, in many cases, theoretically

insoluble. We may, however, make the nature of this difficulty more easily comprehended, perhaps, by reference to the fact, that, while a picture may be perfectly beautiful, each part of it may not be. Each part may be beautiful, only when considered in relation to all the rest. So an object, or an event, may be a part of a whole that is absolutely true and good and beautiful, while by itself it may partake of only one, or even none, of these qualities; and further, while truth, goodness, and beauty are identical in their absolute extent, yet the divisions of the great whole may be different as regards each of these relations, so that the divisions of the world in the relation of beauty do not cover those in the relation of goodness. We will now take each proposition of the reason, in turn, and show the nature of this error in each.

The absolutely true is the absolutely good and beautiful. From this it does not follow that everything that is, is good or beautiful. Yet many reason in this way. There is a philosophy which recognizes everything as good. It sees that goodness crowns the whole, and affirms that, therefore, it is present in every part. It sees neither vice nor crime as really evil. Sin is only a necessary step in the soul's development. Thus it cannot be hated, or even dreaded. A little thought will show that the reasoning is false. The whole may be good, yet a part may be bad. The universal goodness may display itself in neutralizing the bad, even in drawing ultimate good out of it, and yet the bad may be simply and wholly bad

The propositions of the intuitive reason furnish no ground for these partial deductions.

The same fallacy is found in some theories of beauty. Because the absolutely true, the grand whole, is perfectly beautiful, it does not follow that each thing is beautiful. Yet this fallacy leads many to teach that the artist should be a simple copyist from nature. Whatever nature does is beautiful. Copy what you will, it is urged, and if the picture is true to nature, it has reached the end of art. To see the falseness of this, we need only look at any picture. It may be perfectly beautiful as a whole, yet there will be many points in it that have no beauty, — dark shadows, dull blotches, that help the general effect, yet have no beauty in themselves. So the grandest musical compositions have discords, which only make the whole grander and more harmonious.

If we next start with the second proposition of the reason, that which relates to goodness, we shall find similar fallacies to be prevalent. Because goodness rules the whole, many think that it may be recognized at every step. Men even sometimes base their faith in providence on such reasoning as this: Such a thing cannot happen because God is good. If there is a good God, that cannot be. After an escape they will say that they knew they should be saved, because they had faith in God. Now, we cannot reason thus minutely from the infinite goodness. All that we can say is, that all will work out its good ends. The plans of the infinite goodness are large and broad, and may include much that is different from our thoughts of what goodness should effect. In

spite, then, of that faith in the infinite goodness, which is inherent in the mind of man, we cannot reason from it to special events, assuming a thing to be true because it coincides with our notion of goodness. It is only that which violates this absolute principle that we can reason upon with certainty. *Infinite* evil is opposed, and must be opposed, to infinite goodness. Finite evil admits of being transformed by goodness. But prolong evil to infinitude, and it admits of no such transformation. It is only by being temporary, and thus leaving opportunity for this transformation, that sin and suffering are compatible with the idea of the perfect good. What is true of the universe is true of our own selves. When the reason of each affirms that we live in a world in which, in spite of all appearances, the good is supreme, that this absolute goodness is working its own plans through and for the whole, it affirms that we also are the objects and may share the results of this highest law. We cannot, as has been seen, argue from this principle to the certainty of finite good fortune, or against the certainty of pieces of finite ill-fortune; but we can argue against the possibility of any event which claims the power to obscure utterly this promise. Thus men have always, even in the presence of death, felt superior to it. Faith in the goodness that watched over each would not allow the belief of an utter exclusion from the fulness of this hope. Annihilation would be such an exclusion and absolute failure.

Reasoning from the fundamental proposition of goodness bears the same relation to beauty, that it

does to truth. Because the absolute good is one with the absolute beauty, it does not follow that finite goodness is always beautiful, or can take the place of the beautiful. The belief that it can do so is the fallacy of those who would make morals and religion the entire substance of life, excluding the element of beauty, as if goodness could do its work, or fill its place, or were in any way one with it. This is a fallacy which has lost much of its hold upon the minds of men; but there have been times and communities whose whole manner of life was affected by it. Our own Puritan Fathers furnish an example, that shows that the fallacy of which we are speaking is one that has had influence in the world. Goodness was all the beauty that they recognized, and thus their goodness, however noble, lacked the charm of grace and freedom. This notion was no less a fallacy, because, in their case, it was the result of a reaction against a depraved popular sentiment that mistook beauty for goodness, or which, having beauty, was content to let goodness go.

We have thus considered the fallacy of reasoning from the idea of truth or of goodness to either of the other ideas of the reason, except where these all touch in their full and unlimited being. The first fallacy, that of reasoning from truth to goodness or beauty, is mostly that of philosophers. That of reasoning from the idea of goodness to finite truth or beauty, is the fallacy for the most part of theologians. We now come to the mistake of reasoning, under the same finite conditions, from beauty to truth or goodness. This is strictly the fallacy of

art, but more generally it is the fallacy of the merely worldly life. It is often unconscious of itself, or of the method of its reasoning. Yet none the less it is this reasoning that gives its strongest power to temptation.

The reasoning from beauty to truth deserves perhaps less harsh language. It is the mistake of the dreamers, who are deceived by the beauty of their visions to the extent that they accept them for truth. What glitters answers for them as well as gold. Out of this mistake there springs sometimes a second, which is of graver moment. When the dreamer, or the enthusiast, discovers that his beautiful vision had no foundation, he sometimes gives up all trust in the absolute beauty, which is the mould and the result of all things. His private disappointment changes the world into a desolate waste. The reasoning from the beautiful to the good is the logic of sin and temptation. The heart of the young looks upon evil as the unlovely and dreadful; but when this evil comes to it in the form of beauty, when elegance and taste preside over and conceal the wrong, when talent lends the seduction of its charms, it cannot believe that there is anything bad under so fair a show.

This short review will show the power and the extent of these three forms of false deductive reasoning, — the first, the fallacy of philosophizers, the second, of religionists, and the third, of art and life. We will recapitulate in very few words the result of this examination of the relation of these fundamental propositions of the reason to one another. Truth, goodness, and beauty, in their absolute sweep, are

harmonious and identical. Any reasoning from either of these, that shall lead to a result opposing, necessarily, the absoluteness of either of the others is false, and reasoning from one to finite results, that properly belong in the department of either of the others, is fallacious. Equally fallacious is reasoning from what is comprehended under any one of these ideas, to what is comprehended under either of the others.

The three propositions of the reason, taken together, furnish, as has been intimated, the basis of theology, as the first of these propositions, that of truth, furnishes the ground of belief in that induction which is the method and groundwork of science. The terms faith and science are used often, as if they referred to different objects, and occupied different fields of thought. From what has been said, it will appear that faith and science are simply elements, alike present, though in varying proportions, in all knowledge. Faith is only another name for the intuitions of the reason; science is only another name for the formulating and systematizing work of the understanding. Faith is thus the basis of all science; science is the accurate developing and formularizing of all faith. Faith is the unformed nebula; science the completed worlds constructed out of it. Astronomy rests as much upon faith as theology; for, as we have seen, all induction rests upon faith. Science is the reducing all the material of faith to conformity with the fundamental principles of it. Thus, the faith that inspires induction is, in its final and completely self-conscious utterance, the belief that the

world is a complete and systematic whole. Science, then, takes nothing by itself, but brings each fact to the explanation of all others, and all to the explanation of each. Science, commonly so called, then, makes all that it receives as truth harmonize with the first proposition of the reason. Theology will be a science only when all of its material is thus reduced to connection with its fundamental propositions. Simply and practically, the basis of theology is the faith that absolute goodness is one with absolute truth and absolute beauty. Theology will, then, be a science, so far as it adopts whatever results of necessity from this fundamental idea of absolute goodness, in this double relation, and excludes all that conflicts with this idea of absolute goodness. It cannot deny known facts in the material world. It must, then, seek an explanation of them that shall make them conform with its fundamental principle, just as ordinary science forms hypotheses and theories to unite facts into its one system.

From the whole statement it would appear that scientific theology can never be otherwise than large and general. The more it goes into minuteness, the more it endangers itself. It consists in its absolute affirmations, and in a few great truths that depend by necessity upon these. So far as these are accurately wrought out, and their connection with their starting-point and with one another shown, so far it is science. But, in many respects, it must long, if not always, remain mere faith, — a luminous ether beautifying the night. There are many facts in the face of which we can only affirm that all is for the best. When we attempt to show *how* all is for the

best we shall fall into uncertain guesses, and our science degenerate into a similarity to the fantastic world-systems of the ancients.

After this general discussion, we will now consider the reasoning which is proper to deduction from each one of the fundamental propositions of the reason, taken by itself.

a. — OF DEDUCTION FROM THE FIRST PROPOSITION OF THE REASON. — THE LOGIC OF PHILOSOPHY.

The first proposition of the reason, fully stated, is, as we have seen, this, that the universe is a complete and systematic whole. We will not spend any further time in explaining the nature of this proposition, or showing how it is involved in the instinct of generalization, but will proceed at once to speak of it as a basis for deductive reasoning.

Its first use is negative. It forbids us to believe whatever is contrary to this. The syllogism which exhibits the form of this reasoning would be of this nature: In an organic whole nothing disorderly can exist; the alleged fact would be contrary to order, therefore it cannot exist. The most common way of presenting this canon of reasoning is this: What is inconceivable cannot be believed. This proposition has been the occasion of much discussion and misunderstanding. It cannot be taken as true in its absolute form. Much misunderstanding has arisen from the lack of attention to the different classes of alleged truths contained under the general term, Inconceivable, and the various forms of this inconceivableness. To conceive of anything is to bring

the elements of it together in our thought, or to bring itself into conjunction with other objects of thought. To conceive, is thus, — what the very composition of the word would imply, — *to bring together*. It bears the same relation to the intellect that the imagination does to the perception. There are three ways in which an object may be inconceivable. The first is, when the elements of the object are too vast to be grasped, and thus cannot be combined. This does not prevent us from believing in its reality. Thus, we believe that the universe is an organic whole; yet we cannot conceive of this whole. It is too vast. Even if we knew all its elements, we could not bring them together in our thought.

The second form of inconceivableness occurs when the alleged fact is contrary to our experience, or will not fit in with the habitual association of our thoughts. Thus, we cannot conceive of color as separate from some object. We cannot look at a rose, and think of the rose as colorless, and the redness of it as existing merely in our senses. We cannot conceive of it, because all the association of our thoughts of color is in connection with outward objects. Indeed, no abstraction can be conceived, because conception is a uniting, that is, a making concrete. The fact, then, that anything is inconceivable, because it is contrary to the common association of our thought, does not necessarily force us to affirm its absolute impossibility.

The third form of the inconceivable is that which resists the fundamental proposition of the reason, the absolute law of truth. Since to conceive is to bring

together, we cannot conceive of anything standing outside of the absolute order, for standing there it stands alone. And, as we cannot conceive of this, so, also, our reason forbids us to believe it.

We may illustrate this principle by the questions that have been raised in regard to the miraculous. Can we believe in a miracle? If a miracle be a violation of the order of the universe, we cannot believe it. The enlightened reason cannot conceive of such a thing, and rejects it as impossible, not because it is contrary to our experience, but because it is contrary to the very foundation principle of belief. It should be noticed, however, that the inconceivability lies not in the fact alleged, but in the explanation that is given of it. A man may tell us that he saw this or that occurrence. His story is strange, but we say we will look into the matter, and see whether it was so or not. But, if he adds that the event was contrary to all principles of law, we answer without thought or investigation, "That is impossible." We first see whether the event did or did not occur. In other words, we apply to it the principles and methods of induction. If it took place, we affirm that it must have been the result of some law, known or unknown. A miracle, properly so called, is the manifestation of some higher law on a plane where only lower ones had been at work. If the laws of chemistry, of mechanics, of vegetable and animal life, were freely active on the world before the appearance of man, then the first human act would be a miracle on that plane. So the first appearance of vegetation, when the burning mass of the earth had grown cool and

solid enough to admit of it, was miraculous. So, if there is a sphere of spiritual life above us, it has its laws as fixed as those of our own life; and any manifestation of them in our life would be miraculous, but not lawless. This may illustrate how the negative reasoning from the proposition under consideration does not apply to an alleged fact, but only to the suggested explanation of that fact.

Having thus considered the merely negative use of deduction from the first proposition of the reason, namely, that the universe is one perfect whole, we turn to the consideration of its positive use. As the reasoning from the three fundamental propositions of truth, goodness, and beauty, forms the *a priori* part of theology, so the reasoning from the first proposition, that of truth, forms philosophy. Philosophy is made up of this deductive reasoning from the starting-point of absolute truth, just as science we shall find to be the mass of inductive reasoning from observed and collated facts. This is the present and historical use of the terms. There is, doubtless, coming, indeed, a time when these two opposite and often opposing systems shall be one. Whether this final result will be termed philosophy, or science, we cannot tell. For the present, we shall use the words in their distinctive meaning.

We have, then, to inquire whether philosophy is possible, and what are the logical principles that must guide it. We will notice, at the outset, two difficulties with which philosophy has to contend. The first of these is to find some starting-point. That the universe is a connected whole, is a vast and

vague statement. It rouses the thinker to construct an ideal system, that shall conform to, and be identical with, this great ideal. But while it thus stimulates, it also balks. It furnishes no point on which the thinker may lay hold, and from which he may start in the course of his deduction. The first difficulty, then, is, to find an available starting-point. The second difficulty is, that, supposing the beginning to be made, the very nature of deduction is to confine itself to abstractions. Deduction is from the universal, through the particular, to the individual or single. In other words, it is from the broader to ever narrower truth. Every universal contains many particulars included under it. Deduction, by its very nature, can take only one of these. This selected particular includes many others. Of these, the line of our deduction can take but one. Thus, deduction must be more or less abstract. It can never reach the real, full, concrete individuality. The individuality that it reaches will be that of a single abstract truth. A second result will follow from this, namely, that each universal may furnish, and by its very nature must furnish, more than one line of deductive reasoning. We have seen that the first course of thought must take one particular, leaving others. Each of these that is left may furnish the starting-point for another line of reasoning. Thus, we have two courses of thought, each resting on a sound basis, and conducted according to logical rule; but the two have by necessity a certain antagonism. This phenomenon is of universal occurrence. We shall meet it in every separate department of deduc-

tion. The opposition of these two or more courses of thought is called an antinomy.

The fact of the continual presence of this antinomy, shows the fallacy of that reasoning, which affirms, that of two opposite statements, one must be true, and the other false. This form of reasoning is very commonly recognized, even by logicians, as reliable. From what has been said, it will be seen, however, that the presence of this contradiction does not involve the absolute truth or falsehood of either side. Each may be true, and yet each in a certain sense false, because it is only partial. It will be seen, also, that it is only by this varied and often opposing system of reasoning, that any universal principle can be fully developed. Each deduction being partial, it is only in the whole that perfect truth is found. We shall meet this fact of necessary opposition and contradiction so often, that this abstract statement of it must be sufficient here.

We have found, then, at the very foundation of philosophy, two difficulties; one, that of finding a starting-point. This difficulty, however, may be merely an obstacle, that, after it is passed, will give no further trouble. The other is the necessity that confines philosophy, to a certain extent, in the region of abstraction. This is a difficulty that can never be wholly mastered by philosophy alone, but will always hamper and restrain it until it is relieved by some power outside of itself.

In order to make clear these principles, and the general laws of philosophy, we must look at its history. A hasty glance at this will show us its na-

ture, and will reveal, and illustrate, the laws and the nature, the strength and the weakness, of pure deduction.

From what has been said of the necessity of the antinomy in philosophy, we shall expect to find opposing systems, and from the difficulty of obtaining a starting-point, we shall expect to find that some of these systems have an unreliable foundation. But it should be observed, first of all, and remembered through all, that from the beginning to the end of philosophy, taking in systems the most frivolous and the most opposed, they all have this in common, that they affirm the absolute unity of the world and of the universe. They all are alike searching for the principle of unity. And if any affirm, that, being diverse, they have been fruitless, we can at starting insist that it is a great thing that this absolute unity has been recognized and insisted upon, even if philosophy have done nothing more than keep this before the minds of men, until science should discover what this principle of unity is. For our present purpose, it is enough that the first proposition of the reason has been the basis of every system of philosophy that the world has seen, and that philosophy upheld the truth of this, in opposition to the unthinking many, who looked upon all things as the result of separate chances or diverse principles.

In looking at the Grecian philosophy, three things must be kept in mind. First, that it rests upon the intuitive perception of the absolute unity of the universe, a perception which experience had, as yet, by no means confirmed. Secondly, that the reason

accompanying this philosophy was designed rather to illustrate, than to prove, the truth of its fundamental principle. Thirdly, that the various systems were each an attempt to construct something that should correspond with the conception of the ideal unity. The authors of these systems saw, on the one side, by the power of their reason, the grand vision of the absolute unity. On the other hand, they were by their senses brought into contact with a world of manifold realities. These opposing principles, of unity on the one side and manifoldness on the other, were to be reconciled, or else one must give way to the other. This antinomy of arguments, springing from the reason on the one side and from the senses on the other, is the central element of Grecian philosophy. This antinomy finds its most complete expression in the Parmenides of Plato, a discussion which Hegel called the fairest flower of Grecian philosophy. This praise is only due to it as the complete expression of this antinomy, which meets us at every step in our study of these systems. The following quotation from Plato's Timæus will illustrate the relation which the arguments and special modes of presentation connected with these systems had to the grand truth which was the basis of them all: —

"When we speak of that which is stable and firm and mentally intelligible, our language should be in like manner stable and immutable, and, as far as possible, unrefutable and immovable, having in this respect no deficiency; whereas, in speaking concerning its image only, and as compared to it, we should use

probable arguments that are in strict analogy thereto." *

Those, therefore, to whom the ancient philosophizing appears weak, should keep in mind the distinction between the object of absolute intuition, on the one side, and the attempt to make this clear and tangible on the other; — an attempt the success of which was rendered impossible by the imperfection or non-existence of science.

To illustrate what has been said more minutely, we will glance at a few of the principal systems of Grecian philosophy. We first meet those which seek some material basis for their philosophical intuition. Thus, Thales affirmed the principle of all things to be water. Anaximenes affirmed it to be air. We cannot be surprised at such divergence. The universe is a circle that might as well begin in one point of its circumference as another. These early reasoners, confining themselves to the circumference, put, one a finger here, and another a finger there, each claiming that its own point was the beginning. In other words, if all the substances in the world have a common basis, and may pass into one another without fundamental change, one of these substances may as well represent the whole as another. Such discussion is like that which might arise in regard to ice, water, and vapor. One might maintain that ice was frozen water; another that water was melted ice. There can be no settlement of the dispute, except by affirming that neither ice nor water nor vapor is the basis

* The translation is taken from that in Bohn's Plato.

of the others, but that some common principle, which is neither, but which may take form as either, is the basis of each and all. This was done in Grecian philosophy by Anaximander, of Miletus. He affirmed that the *Infinite*, or what we may better translate the *Undetermined*, was the principle of all things. This abstraction meant to him, probably, what our word matter does to us. Matter is the undetermined substance that forms the basis of all material substances. The absolute principle, then, is not fire or air, or any other element, but the substance which underlies everything.

While the philosophers that we have been considering saw only the circumference of the circle, but deserve the highest praise for discerning that it was a circle, and not a mere mass of disconnected points, Xenophanes and the Eleatic school plunged at once to the very centre. They made no attempt to reconcile the absolute unity with the apparent manifoldness. They contented themselves with affirming the absolute *One*, and denying everything besides. Man, they say, is blinded by the senses. He takes their varied presentation for reality; but nothing is real save the One. Xenophanes looked up into the blue of the heaven, and cried, "The One is God." Zeno, the Eleatic, carried these doctrines to their extreme, by proving with subtle arguments that there could be no such thing as change or motion. The paradoxes by which he maintained this result spring from that antinomy which we have seen to lie at the very basis of deductive reasoning. Matter, in one aspect, is infinitely divisible. In another aspect, it consists of

finite elements. The results reached by these abstract arguments do not hold good in regard to the concrete substances. The paradoxes of Zeno, though commonly viewed as something special, are only examples of that constantly recurring antinomy which has so often confused the minds of men. They only brought to a sharp contrast that divergence between the reason and the sense which we have found to be the fundamental principle of the various systems of the Grecian philosophers.

The reason had thus announced its fundamental proposition, and had set at open defiance all the power of the senses. Those who believe that the proposition of the absolute unity of the universe is a broad generalization from facts, would do well to observe, in addition to the arguments which have been already adduced, this fact, that its first distinct enunciation was made in defiance, and as a defiance, of the force of external facts and the results of observation. But, in this way, the reason defeated and contradicted itself. It began by an affirmation of absolute unity, and ended by reproaching the whole apparent confirmation of things as false, and as in opposition to this unity. The next step was to bring about an actual harmony between these two elements. The means first at hand to accomplish this was the establishment of some general law. To Pythagoras, this harmonizing law was that of number; to Empedocles, it was the law of attraction or love; to Heraclitus, it was the law of change, the very permanence of succession and difference being made a principle of unity.

Although the theories that have been mentioned, and others which might be added to them, may seem at first sight to anticipate some of the results of modern science, they were at the time valueless, except as illustrations of the great principle which underlies them all. They showed that the absolute unity was possible. They made it conceivable; but as they rested on no basis, and sought no verification of induction, they remained mere floating theories.

Socrates first found any solid support for the next step in the history of philosophy. The early philosophers, and in particular Xenophanes, had uttered the first proposition of the reason, that of absolute truth. Socrates reached the second, that of an absolute goodness, independent of law or custom. As Xenophanes, however, had no system of truth, but only sought to impress upon the world the knowledge and the conception of a truth actually existing, so Socrates constructed no system of morals. He sought simply to awaken the moral sense in the minds and hearts of his hearers. He would make them feel, by scattered instances, that there was a moral law, which was supreme above all things.

Plato completed the foundation of all absolute deductive reasoning. He enunciated the third fundamental proposition of the reason, that of beauty. As Xenophanes affirmed the absolute truth, and Socrates, the absolute goodness, so Plato affirmed the absolute beauty. "If the world, then, is beautiful, and its artificer good, he evidently looked to an eternal pattern, but if it be without beauty . . . he must have looked to one that is generated. It is

evident, however, to every one, that he looked to one that was eternal, for the universe is the most beautiful of generated things, and its artificer the best of causes."* Not only was beauty the end of the universe, it was even the basis and end of virtue itself. Goodness is a power that draws towards itself, by the attraction of its beauty, which kindles an imperishable love for it. The morality of Plato, as has been well remarked, is not so much an outward rule, as the aspiration after perfection.

While one side of the antithesis that lay at the foundation of Grecian thought led to the grand results which we have thus contemplated, the other led, by equal necessity, to very different issues. The reason and the senses, cried the Eleatics, are at variance, consequently the senses are false. The opposite deduction would be the truer one for those who put their faith in the senses, and would as naturally result from the premise; while at the same time the result would not lie far off, that if the very foundations of belief are at variance, there can be no reliance upon anything. The senses and the reason contradict one another. Even the senses contradict each other. This contradiction might as well destroy all grounds of belief, as elevate any one at the expense of the others. Thus there arose, first, sophistry. This played with the differences and difficulties of belief, and settled down to the conviction that expediency is the only criterion of truth. To the sophists, however, belongs the credit of opening that

* Bohn's Plato.

practical path, by which Socrates reached the thought of the absolute good. He changed the practicality of expediency to that of morality. Afterwards, came a school of absolute scepticism. Each side of the antithesis overthrew the other. Nothing was fixed or certain. Still, however, men longed to reach the clear heights of certainty which they saw rise before them, separated by an impassable gulf. The Stoics sought, by the sternness of self-reliance and complete subjugation of the lower nature, to fight their way to these regions of calm repose. The Epicureans were content to contemplate them from the pleasantness of their indolent ease. The new Platonists brought the power of imagination to accomplish what reasoning could not. Visions and trances brought the distant heights near. They fell asleep, and dreamed themselves in the presence of the perfect truth, and when they awoke, their dream seemed to have been a reality.

On looking back upon the Grecian philosophy we see, then, rising in grand sublimity, the three truths of the reason, like three mountain summits, which spring up from a common base. These heights are often obscured by doubts and misapprehension, but they still stand, the only starting-point or basis of true knowledge. The great problem was to find a means of connection between these and our common life. The special systems were attempts, and unsuccessful ones, to accomplish this. In what has been said, I have made no reference to Aristotle. This omission has been intentional, for with him we see the beginning of a new order. Aristotle perfected the

system of deductive reasoning, so far as to give it a perfect form, and to guard it against mistake. It was a bridge, over which one could pass between the ideal and the actual. All that was needed was to have some point on either side on which it could rest. This was lacking. Aristotle, in maintaining the necessity of induction, did not develop and perfect its principles as he did those of deduction. His theory of induction, as so often happens with theories in the history of thought, was in advance of his practice. He thus had reached by induction no general truths on which his syllogistic apparatus could rest. And on the other side, the absolute truth of the organic unity of the universe, rising smooth and unbroken, offered no place on which a deductive syllogism could be based. We have thus in the case of Aristotle, and still more in that of the school men who professed to follow him, a constant practice, or we might even say play, with the deductive formula. This, however, degenerated more and more into mere formalism. It was very much like what the practice of engineers in making bridges would become, if for a long time they occupied themselves in constructing and reconstructing their works along the side of a chasm, while they were unable to find any means of stretching their structures across it.

We may illustrate this position by reference to the first proposition of the reason, which furnishes the basis and sphere of philosophy. This suggests and authorizes such a syllogism as this: A perfect and systematic whole must contain whatever is essential to this completeness; the universe is such a perfect and sys-

tematic whole; therefore, it must contain whatever is essential to its completeness. In this, all philosophies agreed. Each constructed its system, the only proof of which was its perfection. But to construct such a system with accuracy there was needed some certain element in the real world, some special *fact*, which was undoubtedly based upon truth. If this were found, there would a definite starting-point for the work.

Thus the naturalists of the present age knew that all the creatures of the pre-adamite world were perfect organizations, containing all the elements necessary for their existence; but yet they could not, on this basis alone, construct the plan of any one of these organizations, the remains of which had not been discovered. So soon, however, as a single bone was found that belonged to one of these hitherto unknown organizations, the conditions of the problem were changed. The naturalist felt authorized to assume the special elements necessary to the perfection of an organism of which this bone was a part; and the result showed that the assumption was well grounded. So philosophy needed not only its abstract starting-point, the affirmation of absolute truth; it needed, also, some particular truth for the free working of its processes of reasoning. Its systems had been fair and rounded worlds, indeed, but worlds floating in the air, reflecting only the beauty of the absolute truth. Not till the starting-point just described should be given, would its system be a real world, one with the absolute truth.

With the awakening of modern science, however, men began to rear out of solid facts foundations for

legitimate deduction; while, on the other hand, Descartes at length succeeded in finding a solid foothold and secure resting-place on the side of abstract truth, which had so long set at defiance all attempts to scale its difficult heights.

This sure resting-place, that was discovered by Descartes, is expressed in his famous sentence, "*I think; therefore I am.*" "*Cogito; ergo sum.*" Here, at last, was found a certain truth, a special starting-point for deductive philosophy. To realize the importance of this starting-point which was furnished by Descartes, we must have clearly in our thought the difficulty which it was designed to meet. Philosophy believed in its great ideas; the constant search to realize them showed its faith in them. But at the same time its results threw a haze of scepticism over the individual facts of the world. You say, "I see the world about me." — "Nay," answers philosophy, "you have only an impression on your senses." You say, "I run," "I leap." — "Nay," answers philosophy, "you think you run and leap." "At least, then," you answer, "at least, I think;" and philosophy recognizes, with joy, something that admits of no doubt. The starting-point for constructing the system, which it believed could be constructed, is at last found. Real existence is reached. The gulf that separated it from pure thought is spanned. "*I think; therefore I exist.*" Descartes did not, however, make the fullest use of his discovery. He did not construct a system of deductive philosophy from this basis. He simply asked, "How do I know that this proposition is true?" and having

determined this, he sought to find other propositions to which the same test of truth might be applied. The undertaking, by its very nature, could, however, result in nothing definite, because the assumption at starting was, that this proposition stood out, distinct from all others, in absolute certainty. It was, thus, by its very nature, fitted to be a germ out of which other propositions could be developed, not a pattern to furnish a test of their reliability.

The formula, *Cogito; ergo sum*, strictly carried out, would lead into a narrow egotism. Personality and personal relations would be the criterions of truth. It would lead, in its common use, merely to theological results. These, theology on the one side, and egotism on the other, would be the two sides of the antinomy that would spring from this foundation.

Looking at the basis established by Descartes, we see that he has only half stated it. Not only may we say, *Cogito; ergo sum*, but also, with equal truth, *Cogito; ergo cogitatio est.* "I think; therefore thought is." Whether anything else is, or is not, thought is; and in thought we have a real, manifold, and organized world. While the first path leads to personal relations, and must, necessarily, have more or less subjective results, the other leads out into the unlimited realm of thought, and brings us into contact with realities outside of us. For thought is not my thought merely; it is independent of me. My existence or non-existence has little to do with it. It is a force which controls me, but it is vaster than I. All I know of any existence is what this tells me.

I think; therefore thought is. By this formula is reached something actual and external.

Hegel is the first who developed this side of the Cartesian principle. I do not remember, indeed, that he anywhere recognizes this relationship; but it is none the less true that this is the foundation of his philosophy, the source of his power, and also the occasion of whatever is defective in his system. Hegel first enunciated, and consciously realized, what has lain at the foundation of all speculation and study, namely, that the laws of thought and of being are identical. In other words, he simply affirmed the reality of thought. Thought is real, and thus when I have to do with thought I have to do with a real world. He also saw that this is all the reality with which we can ever come in contact, that the world can never exist to us except as thought. At the same time he had that faith in thought, without which there could be no thought. He therefore affirmed, not merely that the world of thought is real, but that it is the real world; in other words, that thought and being are one.

I have said that this lies at the foundation of all scientific thought. Philosophy and science are the attempts to express the relations of common things in the relations of thought. Now, if the laws of these two are not identical, the whole struggle of science as well as of philosophy is unnatural and delusive. If the laws of nature are not the laws of thought, then the scientific treatment of nature is a forcing and distortion. It is easy to ridicule this assumption, but no one can really think, who does not have faith in his

thought, and faith in thought is simply this confidence that it is essentially one with the objects of thought. It is impossible to prove it, for proof would be an appeal to thought, and would thus assume the faith supposed to be proved. It is as impossible to disprove it, for confidence in the negative argument would involve confidence in thought. It is further impossible to rest in a state of scepticism, and to regard the whole question as one of impossible solution. Our faith in our thought is the strongest instinct of our nature. To disturb this confidence requires the most subtile argument. It requires us to surrender the foundation of our consciousness at the demand of the intellect. Thus even to doubt the reliability of thought, at the demand of thought, would imply more faith in it than *to believe* anything else at its bidding. We can only inquire into the nature and extent of this correspondence between thought and the outward reality; and this problem will meet us in the last general division of this work. Faith in thought, it will be observed, does not involve faith in the completeness of my individual thought, but of absolute thought. The laws of the world are no less real that I often disobey them. The laws of thought are no less reliable, because my thought may be narrow and weak. This expression of the identity of the laws of thought with those of all reality is simply the utterance of what has all along been the moving power of science.

Hegel only uttered openly and consciously what every thinker, whether philosopher or day laborer, had unconsciously taken for granted. He simply dis-

closed the principle which is involved in the instinct of thought, that most universal of all the instincts of humanity.

But the clear comprehension of this principle gave to Hegel a wonderful power, and its enunciation marks one of the epochs of the history of philosophy.

To what has been said must be added that Hegel first saw the true nature of thought itself, and comprehended its manner of growth. He gives to Kant the honor of first discovering that the antinomy of thought is a necessary element in its progress; but to Hegel himself belongs the honor of first incorporating this essential antinomy into a system. To him also belongs the honor of recognizing the finiteness of this antinomy. With Kant, this opposition of results, based on apparently irrefragable deduction, imposed an impassable barrier to the advance of absolute knowledge. Hegel saw that this division and opposition was merely a single stage in the development of thought. He saw that this antinomy was only the preparation of a higher and more perfect unity, which from this process of development had lost its abstractness, and become concrete, the last stage involving all the elements of the preceding ones.

Thus recognizing the fundamental nature of thought, and the identity of the laws of thought with those of all being, Hegel was provided with an instrument of great power, if not for the discovery, at least for the organization and systemization of truth. His philosophy is, it must be remembered, a method, not a

result. This highest development of philosophy only illustrates and confirms that one of the fundamental maxims with which we started, which asserts that deduction by itself cannot reach finite or individual facts. It can give the great form which these facts must assume, the absolute law which they must follow; the facts being given, it can discover their necessity and fundamental relation; but by itself it can never get beyond these fundamental principles.

From what has been said, also, will be seen a still further limitation of the Hegelian philosophy. We have seen that the fundamental starting-point, which is *thought*, may give rise to two different systems of deductive truth. One of these starts with the formula, *cogito; ergo sum;* the other starts practically with this, *cogito; ergo cogitatio est.* The one leads to the emphasis of personality, the other to the emphasis of law. Hegel, taking the second path, leads us into the realm of absolute causes and relationships. The tendency of his method has been recognized all along to lead to the practical neglect of personality and free agency. All things are seen to be the product of an endless and resistless development, of absolute forces, working often by an inevitable opposition to each other, but thereby preparing a more perfect consummation. This view of things brings out truth that otherwise would be hidden. It is essential to the fundamental and scientific view of the world and of history. With other elements of the same system, it has given an immense start to the sciences, from the lowest to the highest, yet it is

none the less imperfect. The other direction is still open. The *cogito; ergo sum*, is as true as the *cogito; ergo cogitatio est.* The system of Schopenhauer, indeed, which affirms, instead of thought, the *will* to be the reality of all things, represents the antitheses to the system of Hegel. These two magnificent systems stand over against one another, the halves of a divided world. They stand, it must be noticed, in antithesis, not in opposition, to each other. Their relation is polar. Each is at heart the other. The will is the undeveloped thought. Thought is the expanded will. Thus thought is not, as Schopenhauer intimates, the accident of will. It is its other side, its rounded and completed self. Each of these great systems is thus imperfect. The system of Hegel needs the grand motive power of the will; that of Schopenhauer the expansive power of thought. It is less a system than an affirmation. The *will* of Schopenhauer, indeed, is not free will, for there can be no freedom without thought. Thought and will are only in perfection even in idea, when united, as doubtless they will be in the future, by some system grander than any that the world has seen.

The fundamental antinomy of speculative philosophy has long been felt to be that between freedom and personality on the one side, and necessity and law on the other. This antinomy admits, as yet, only a practical solution. Reason has not yet been able fully to unite its elements. Yet they are united in every conscious act of our lives. Their only perfect union is found, however, in virtue. This unites

the absoluteness of law with the absoluteness of freedom. In this, the will and the intellect are in harmony. Thus the course of our thought has brought us to the consideration of deduction from the second of the propositions of the reason, namely, that which affirms the absolute good.

b. — DEDUCTION FROM THE SECOND PROPOSITION OF THE REASON. — THE LOGIC OF MORAL SCIENCE.

We have already seen the basis on which moral judgments rest. Without repeating what has been said, it will be sufficient to refer generally to the fact that the moral sense branches in three directions, recognizing the duties towards one's own nature, especially that of integrity, the duties towards one's fellow-men, and those towards God. We thus see the fundamental principle dividing itself; and it is the business of moral science to trace out each of these divisions in its reference to the others, and in its own ramifications. It is simply the duty of logic, in relation to moral science, to show how far it is a system of deduction, and the special difficulties under which this deduction labors, and to guard against the mistakes into which it is apt to fall. Our business is, then, by no means to construct a system of moral science, nor the outlines of one, but simply to show the conditions of the science, and to criticise its methods.

In taking the first step we discern that the simple division already proposed is in some respects artificial. It is impossible to make a clean division in the

manner prescribed. For, first, our duties to God involve those to ourselves and towards others. It is his will that we should serve our fellow-men, and preserve the integrity of our own nature. Secondly, our duties towards ourselves include, besides integrity, those to God and to man. One who lives selfishly corrupts and degrades his own nature. And, in the third place, our duty towards others includes our duty towards God and to ourselves. One who corrupts his own nature is a power of corruption in society. He who lives an absolutely irreligious life helps to lower the standard of social life about him. We might, then, construct a system of moral science upon any one of these bases. But yet, such a system would not be perfect. Though my duty to my neighbor is involved in my duty to God, yet I should not fulfil the duty if I did it merely from this secondary motive. If I gave help to another, simply because it was God's will, with no feeling of love or sympathy, the act would be cold and heartless. So, also, my duty to myself requires me to exercise charity towards others; but if I should assist others merely to perfect my own nature, as an act of moral gymnastics, the act would have little beauty. It is in this way that much benevolence fails of its end, by being mechanical, either from a desire to obey God or to perfect one's self. At the same time it must be admitted that the act is also imperfect if done without these other considerations. An act of benevolence has its true dignity only when all three of these elements enter into it. One must have a feeling of sympathy, an aspiration after completeness, and a

sense of the infinite love of God, of which one is the instrument, in order to give to a deed of kindness the full perfection of its beauty.

This, then, is the first difficulty that moral science has to contend with, that each heading, though distinct from the others, yet includes the others; and that thus all its principles are involved at every step. We might then expect a freedom from that antagonism which we have found elsewhere. Principles that are so involved ought, one would think, to be at least harmonious. The contrary result springs from these conditions. The elements that when combined flow together naturally, when separated are apt to stand over against one another in stiff and harsh opposition. In other words, we find here, more strongly than in any other form of deduction, that antinomy which is inseparable from all deduction.

For, first, each of these principles, when carried out, falls itself into division, often into stern opposition. Thus our relation towards God involves worship and obedience. Taking the first of these, worship, by itself, we find that it involves, also, two elements, first, that of the spirit; and, secondly, that of the form. This last, the element of form in worship, is a necessity of our human constitution; first, in order that many may unite in a common service; secondly, that the thought of the worshipper may be confined and directed. Now, when we have enumerated these distinct elements that spring out of the central idea of our relation to God, we have named the causes which, perhaps, more than any others, have served to convulse the world. The

questions of religious form and religious liberty, the question of faith and works, these have brought divisions into the church, the effects of which have extended far outside of it, and have shaken the whole structure of society. What has given the prominence and the violence to these controversies is the fact that each partisan could reach his position by what seemed to be a faultless deduction from a starting-point that was unquestioned. Religion does need faith, and without faith works are nothing. It does need works, and without works faith is nothing. Each argument is legitimate. The church does need unity. It does need liberty. Here, too, each deduction is legitimate. Yet either carried to its extreme may be false, because it is partial.

In our relations to others there is the same diversity of elements. We are to respect their liberty, and, at the same time, to work out their welfare. Here we find at first glance the foundations of political revolution, and, to a great extent, of political parties. The conservative and the radical appeal each to one of these principles. The one pictures the danger of a disorganized society, and shows how every change in the direction of reform is in the direction of the general removal of all the old safeguards. The other insists upon the rights of the individual, and shows the danger which results to these rights from an excess of authority. In practical benevolence we find the same difference. One will see what is absolutely best for another, and will seek to bring it about without regard to the other's wish or will. Another will respect the individuality of the

person that is suffering, and allow him to ruin himself if he will. Hence arises, also, the discussion in regard to the best means of assisting the poor, such as that in regard to poor-rates and the like. One will picture the suffering of the poor and the need of alleviating this. Another will insist upon the virtue of foresight, and urge that the poor-rates, by making men improvident, increase the evil they were designed to prevent.

Our duties to ourselves involve similar divergence. We have many needs and many relations. It is the duty of a man to provide for his own material welfare. Also, it is his duty to preserve his integrity and to develop his spiritual nature. These duties may come into collision, and one of them may have to be sacrificed to another, and it often causes grave difficulty to know where the line shall be drawn.

We meet, if possible, graver difficulties when we consider the collisions that may arise between duties that grow out of one of these spheres of morality as opposed to those which spring from another. Such, for instance, is the law of truth and integrity on the one side, and the law of benevolence on the other. Suppose that, by speaking the truth, I shall cause another to suffer an unjust death; is it my duty to tell the truth or a falsehood? If we look at examples we shall find that our applause is bestowed almost equally upon the obedience to either one of these principles in defiance of the other. Though abstractly we should, perhaps, say that the law of truth is the highest, yet we honor a falsehood, especially a self-sacrificing one, which saves the life or honor of another. Lucilius

cried out to the enemies of Brutus, "*I am Brutus*," and received the stroke that was meant for his friend. Desdemona, with her dying breath, denied the guilt of Othello. We feel in these falsehoods the presence of a magnanimous virtue. On the other hand, if a man, by steadfastness to what is just and honorable, plunges his family into poverty and suffering, we honor him. We honor Jeannie Deans for her truthfulness. In the novel of Victor Hugo, "*Les Miserables*," we honor the nun who saves the life of Jean Valjean by a lie; and we honor Jean Valjean, who, rather than abstain from telling the truth, brought misery upon himself and others. The long line of martyrs is made up of those who would speak the truth in spite of all things.

Moralists have been much puzzled to know what to do with these cases of extreme conflict. Thus, Whewell hardly ventures to intimate what is right in such cases. He shrinks from saying that a lie is ever excusable, for fear of disturbing the foundations of morals; and, on the other hand, he shrinks from saying that a lie is never right. He abstains from giving any opinion, because, as he says, such cases lie outside of common morality, and, further, because, in such cases, a man is surprised and thrown off his balance, so that if a moral rule were given it would have no effect. This is very much as if a work on navigation should lay down all the rules for calm weather, but none for the time of storm, giving as a reason, that in a storm there is so much excitement that no one would remember the rules if they were given. The fact is, that one of the grand uses of any sort of

rule is, that it helps one to preserve his composure and self-command in time of excitement and peril.

The great error of the moral philosophers is in supposing that this collision is confined to these marked cases. They go on the assumption that a man's only difficulty is to distinguish between right and wrong, and to follow the right forsaking the wrong. On the contrary, it is probable that few persons who are moderately conscientious have to choose, often, between what they recognize as right and what they recognize as wrong. The great conflict of the moral life is a conflict of duties. What do I owe to myself, what to my family, what to the world at large? Of two actions, which will be most likely to do good? A myriad questions of this kind are those which the person trying to lead the best life has to answer; and those questions of necessity, which have been referred to, are only extreme and startling instances of this antinomy.

The Greek dramatists, with their deeper intuition, saw that these collisions of duty are the real tragic elements of life. In the ancient tragedy you do not find vice and virtue pitted against each other. You find antagonistic duties, each insisting on its observance, and bringing retribution for its neglect. Thus the claims of the family and of the state are very often brought into this tragic antagonism. Thus, the state demanded the death of Iphigenia, the daughter of Agamemnon, for otherwise, said the oracle, Troy could not fall. Agamemnon slays, in sacrifice, his daughter, thus violating the tenderest law of the family. The family, in the person of Clytemnestra,

avenges itself by his death. By this act, however, Clytemnestra falls into twofold crime, slaying at once her husband and her king. Orestes avenges the death of his father and his king by slaying his mother. The deed is urged by the gods, yet none the less is he followed by his mother's furies. Such is the spirit of Greek tragedy. It is a swing from a crime against one law, through its retribution, into a crime against another law, in a succession that might be endless.

We have thus growing out of the moral law the gravest possible antagonism, because each side claims for itself the dread authority of conscience. Let us now glance at one or two of the general rules that have been given for settling these controversies. The first of these rules which we will notice is that which was proposed by Kant, and adopted with applause by Cousin, as a final settlement of the whole question. It is this, namely, that in case of doubt we should ask ourselves what would be the absolute duty of all men under the circumstances. We should appeal from a single case to all similar cases. This rule contains, or suggests, one grand attribute of morality. In many cases it would be of service in recalling one who is carried away by temptation to himself. But as a universal criterion it fails. For, first, we have already seen that there are cases in which the moralist himself, in all the calmness of his quiet thought, cannot determine what would be the absolute rule for all persons. And, secondly, this appeal to universal propriety is just that which cannot be made fairly in times of excitement. Indeed, it is by reference to this very principle that wrong invari-

ably justifies itself. Every mood defends itself by such a reference to the general duty of all men. The man who is revenging an insult insists that every man of spirit would and should do what he is doing. The mean man will tell you that he is a fool who will not look out for himself. Thus, this rule, though it does much to clear up our general atmosphere, is powerless where it is most needed. What is called the golden rule is the nearest possible approximation to a perfect criterion of duty. One must do as he would be done by. It rests upon the fundamental intuition of the moral sense. But even this is more useful to cultivate the general spirit of benevolence than to determine the nature of any individual act; for, in the first place, its application presupposes a certain amount of imagination, by means of which one can put himself in the position of another; and, in the second place, the rule relaxes its requirements where it is most likely to be obeyed. If a selfish man would do to others as he would be done by, he would be a marvel of generosity; while, on the other hand, if the self-forgetful man did no more for others than he would have done for himself, his self-sacrifice would be comparatively slight. At the same time this rule does nothing towards settling the rival claims, in any case, between integrity and benevolence.

All the possibility that remains to be considered is that of forming a hierarchy of duties, with the understanding that, in every case of conflict, the lower should give way to the higher. This, however plausible it may appear, would be very far from

settling the difficulty. We have already seen that antagonisms arise between duties that stand on the same plane, as, for instance, between what we owe to a man's independence, and what we owe to his welfare; or in regard to the division of our assistance between different claimants. But even between those duties that stand on different planes this method would fail. For instance, a small violation of one law might be required to prevent a vast breach of another. A falsehood is equally false whether spoken, acted, hinted, or implied. Even the law of truthfulness may be carried to an absurd extent. I knew of a daguerrean artist who refused to fix the attention of a child by imitating the voice of a cat, on the ground that he never deceived children. There is, also, an immense difference between a generous falsehood, spoken by a sudden impulse, and one spoken by premeditation. If there is this difficulty in laying down abstract principles and rules for the most fixed of human obligations, the difficulty is infinitely increased when we descend to more complex relations. There are two poles of duty. One is the abstract law, the other is the result which will flow from any act. An injustice may be rectified in such a way that the remedy shall do more injury than the wrong. We thus reach the absolute underlying antinomy of morals. If we look merely at abstractions, we fall into a harsh, mechanical formalism. If we look only at results, we fall into Jesuitism. The relation of these two, and all the minor relations included under them, cannot be determined beforehand by any system of laws, how-

ever simple or however complicated. It is the moral sense that must make the decision for itself, according to the special circumstances of each case. What is remarkable is, that in ordinary cases a right-meaning moral sense can determine in such a way as to avoid grave error. If, in those startling cases that have been referred to, it is more at fault, it is because they occur so rarely that the moral sense, which is used to judging familiar cases by common intuitions, has had no practical culture that will enable it to meet these exceptional complications. It can, therefore, only applaud an excess of any one virtue, even though it be at the expense of another.

From what has been said, it will be seen that a perfect deductive moral science is impossible. Moral science can show the foundation of virtue and its grandeur. It can develop special virtues into their branches and fruit. It can even give some clumsy approaches towards an establishment of a hierarchy of virtues. But life does not follow exclusively any one law. Every action is mingled; and moral science, in attempting to establish minute regulations for life, either degenerates into a barren prolixity of casuistry, or else concentrates itself in no less barren commonplaces.

This difficulty of forming a perfect system of morals does not at all conflict with the idea of the unity of the moral law. It simply recognizes its complex concreteness. Yet the moral law, even in itself, is an abstraction, and is only transitional. No action is complete so long as it is performed merely from a sense of duty. Moral obligation is not the

highest principle of action, neither is a merely conscientious man the highest type of manhood. If a man provides for his family, is faithful to his conjugal relations, is kind to the poor, merely because he recognizes all of these as duties and is trying to act conscientiously, the development of his character is as yet very imperfect. That religious service which is paid as a matter of conscientious duty is not the highest worship. All of these relations to man and to God should be fulfilled, if performed rightly, because one's heart is in them. There is a principle of love which is higher than the principle of duty. This is recognized on a large scale in the history of religion. Judaism was a religion of law. Christianity is a religion of love. Judaism sought to control the life by a system of external rules. Christianity seeks to control the life by an inward principle of love. Every duty is susceptible of being performed on either of these planes; but none is complete until it has been translated from law to love, until, instead of being the result of a principle of duty acting upon one from the outside, it flows out of the inmost and essential nature of the person who performs the act. Thus, though the moral law is necessary for those who have not reached the higher plane, as it is necessary also for those who have reached this complete development only in the case of one or more virtues, or who are liable — as who is not? — to variations in the spiritual life, yet it is by its very nature transitional. Its imperfection results from this transitional nature. The best acts cannot be produced by any system of rule. The way to

produce morality in a man is to infuse the best spirit into him, and let him act himself. This free development and manifestation of the best life corresponds to the definition that has been given of beauty. Beauty is this free manifestation of the highest ideal in any sphere or plane of being, natural or spiritual. The imperfection of moral science thus introduces us into the study of deduction from the third proposition of the reason, namely, that of beauty.

DEDUCTION FROM THE THIRD PROPOSITION OF THE REASON. — THE LOGIC OF ÆSTHETICS.

The study of æsthetics would naturally divide itself into three parts, which might be called scientific, critical, and creative. The first would have to do with the absolute science of æsthetics, deducing the whole from the fundamental principle of beauty. The second would have to do with the criticism of objects with reference to their beauty. The third would have to do with the production of beautiful objects. If the science were perfect, all of these, it is evident, would be united under one head. The principles of the science would furnish the rules of criticism and of creation. Whether such a result is possible, and the principles according to which this result must be sought are the questions with which logic, as such, has to do. It should be further remarked, that the same division would, abstractly considered, be possible in the study of ethics. The difference between the two studies is that moral actions are transient, while æsthetic results are permanent; and, further,

that moral actions are for the most part the result of a single volition, and artistic creations of manifold and prolonged activities, and therefore the elements of criticism and creation form a much more subordinate part of ethics than of æsthetics.

The usual method of forming systems of æsthetics has been to take some common element of beauty as a basis, to show how this occurs in beautiful objects, to proceed triumphantly, at first, by the enumeration of cases in which this seems predominant, then to twist less conformable instances into harmony with this principle, — a process that becomes less satisfactory the longer it is pursued, — and, finally, to deny the name of beauty to whatever stubbornly resists this process. Perhaps the most ingenious of these attempts is that which would reduce beauty to association. This has afforded opportunity for very elegant and, to a great extent, plausible treatises, which, however, by the very nature of the attempt must be found wanting in the end. The attempt was somewhat similar to one which might be made to reduce light to reflection.

Without enumerating more of these attempts to reduce beauty to a single principle, the futility and partialness of them all will be seen by comparing them with the definition given above, namely, that beauty is the free manifestation of its real or ideal nature by the universe at large, or by any of the elements of the universe.

The words real and ideal are here used as fundamentally identical. A perfect plant of any genus or species is the ideal of this genus or species, while at

the same time it is the real exemplification of it. It is its nature uninterfered with by any external force. So a pure sound may be called an ideal sound, because it gives the true nature, that is the reality, of the sound. With this explanation we may use the word ideal and idea, and define beauty to be the free play and manifestation of the idea. This opens, it will be seen, a field as wide and as varied as the universe itself. It recognizes beauty in matter, in sound, in life, and in spirit. The variations are infinite, yet the absolute principle is everywhere the same. It is the free play, the unhindered manifestation of any of the forces of the world, or of all of them together in their grand unity. The ocean and the heavens are beautiful, showing the free play of the mechanical forces of nature in their stupendous power. The springing flower is beautiful, showing the free play of life. And thus we may find, through all the spheres of nature and art, beauty meeting us at every turn.

As we are not writing a treatise on æsthetics, but on the logic of æsthetics, it would be out of place here to pursue farther this tempting theme, to define the respective spheres of beauty and of sublimity, or to illustrate at any length the mutual play, the help, whether by harmony or contrast, of the forces of nature and life among themselves. The tree by the seaside or on the mountain side, by its own twisted and stunted shape showing the might of the forces of the elements that drive their wild play about it, may furnish the hint for the explanation of such combinations. For the present, we have only to consider the manner

in which an æsthetical system may be evolved from this principle.

As has been already stated, the fundamental method of such a system, after the first laying down and establishing the principle on which it rests, must be historical. The system will be *a priori*, in so far as it establishes beforehand in general terms what is to be expected. It will be deductive, in so far as the nature of beauty in general, and every department of it in particular, will be deduced from the principle which lies at the root of this whole or of this department; yet it will be historical, and thus *a posteriori*, so far as its business will be to take things as they are, and to unravel in life, in nature, and in art, the course of the development of this fundamental idea. In such a system all the partial elements of beauty will have their place. Association, harmony, unity, adaptation, and whatever else has sought to set itself up as the head, will here find its true position. Thus, for instance, adaptation of means to an end will find itself recognized as one of the implements or elements of beauty. But it will not be the manifestation of means to any end or service outside of themselves, as a machine is adapted to do a certain work; it will be rather the adaptation of means to an end within themselves, as life manifests itself by the structure and activity of the living body. The more perfectly this body is fitted to manifest its life, the more beautiful will it be. The life it manifests will be its own. It is its own end, and its beauty results from its adaptation to develop and manifest itself. Such a system of æsthetics, being to a certain extent deductive, will

involve something of that antinomy which we have found to be inseparable from deductive reasoning. The underlying idea will divide itself, and its branches will divide themselves afresh. We shall have differing styles of art and schools of art. We shall have art and nature over against each other. But as in beauty the struggle of a thing to be what it should be is ended, the beautiful thing already being what it should be, so the strife of this antinomy is solved. Each of these results being permanent, they all have their place. Though men may contend about them, they do not contend with each other. The schools of art may wrangle, but the science of art adopts all their products, so far as they have been true to themselves, into its great whole. It includes all extremes, however much they may be separated from each other. It has a place, however lowly, for the red beads which satisfy the æsthetic requirements of the savage, for they have the beauty that results from pure color, besides contrasting harmoniously and naturally with the green leafage in the midst of which the savage life is passed. Yet it reaches high enough to include the most magnificent results of human art. On the other hand, this catholicity does not exclude the rejecting from the system of æsthetics some things which may have been considered beautiful at some times or places, but which cause in us only disgust. It explains, rather, the reason of this disgust, and justifies it. The tattooing of the face and form, the compression of the feet, the extravagance of dress, all of these mar and disfigure the pure ideal of life. The science of æsthetics must thus recognize a false, as well

as a true, taste. This introduces us to the second division of æsthetical study, namely, that of criticism.

Criticism has been said to be one of the lost arts. Perhaps it might be better said to be one of the undiscovered arts. There is at present no uniformity nor any standard of criticism. Each attempt depends upon the caprice of the critic. One will say that Pope was no poet. Another will say that the poetry of the present day is weak and hardly worthy of the name, because it is deficient in objective delineation. Another will say that the poetry of the present day stands higher than any that preceded it, because it first develops, on a grand and free scale, the spiritual elements of our nature. This extravagance of variation results, in part, from the very vague notions which exist in regard to the science of æsthetics. If this had been developed among us according to the logical principles just laid down, there would be less divergence of result, because there would be, to some extent, a common standard. Before, however, illustrating the style of criticism which would spring from a perfected science of beauty, we must admit that, at best, a great deal must be left to individual judgment. The first and the last appeal is to individual taste. Thus artistic and literary criticism must always be, to a greater or less extent, dogmatic. A musical composition may be in precise accordance with the laws of music; yet this does not determine whether an air or a theme is beautiful or not. A poem may be in a sense faultless, and yet lack the *Je ne sais quoi*, which would make it beautiful. The critic, with natural and cultivated taste, must intui-

tively recognize the presence or the absence of beauty. This intuition is his starting-point, and upon this he must insist, whether with or without reason, whether in accordance with, or in opposition to, the opinion of others. Thus the starting-point of criticism is dogmatic. This, however, is only the starting-point. Its correctness depends upon correctness of taste. The science of criticism teaches how to justify the verdict of taste. The critic, not content with saying that an object is beautiful, goes on to explain why it is beautiful. The method and the science of this constitute criticism. The method of this may be gathered from what has been said above in regard to the nature of æsthetics. The critic must not stand on the outside, and apply external and foreign measures. He must penetrate to the very heart of what he is examining, must discover the ideal, or the idea, which is its heart, must see how, and how perfectly, it has developed itself, and thus judge every work by a standard of its own. This principle admits of a broad and general, as well as of a special, application. Every period of the history of art has had its own ideal, and thus also its own methods. Each, thus, must be judged by its own principle. It would be unjust to apply the same rule to the Egyptian Sphinx, and to the Apollo of the Belvidere. It would be unjust to decide upon the merits of an antique Venus by the same standard which we apply to a Madonna of Raphael. The Parthenon at Athens and the Cathedral of Cologne are both examples of architecture, but each springs out of the life of the period in which it was wrought. Each has its own ideal after which it was imaged, and

the measurements of neither can be applied in judgment to the other. A whole epoch is represented by each. Each is beautiful, but each has its own beauty.

This principle of judgment admits of narrower and narrower application, according as we look upon a work of art in its relation to one of the grand divisions of history, or to a shorter and more restricted period, or to the individuality of its author, or even to the special purpose or end of the work. The spirit of a man undergoes a development as regular as that of the world itself. The deeper, the grander, the spiritual nature, the more regular and complete is this development. Especially in the present age of subjective literature, though more or less in all ages, the development of the inner nature of the author, or the creator, will appear in his works. These works, wrought out at different periods of this history, or rather the products of these changing periods, must, of necessity, if they spring out of the life of the author, have a common life running through them. If these works be poems, they must be in some sort one grand poem, just as the artistic results of all history together form a complete whole. The "*In Memoriam*" of Tennyson differs from his "Princess" as the Gothic cathedral differs from the Grecian temple, though the difference is less broad. It not only differs from it, but it stands in a certain definite relation to it. No one can thus properly criticise the works of Tennyson, taken as a whole, unless he has penetrated to the inner life that binds the whole together. What is true of the works of Tennyson is

equally true of the works of every writer who has power of life enough to assert itself in this way, and the same principle of criticism should be applied to them.

The criticism of any single work in art or literature should be conducted in a like sympathetic and penetrating method. It is the mere simulation of criticism to stand on the outside of a work, and point to one part and to another, and say, "This is pretty, and that is grand, and this is imperfect." We want the critic to go to the heart of the work, to discover the central power of its life. He must have sympathy enough with it to know why it was produced, how it took hold of the author's mind, what he was trying to do, or to what he was unconsciously impelled. In other words, he must find out what the work was produced for, the idea out of which it sprang, the ideal towards which it aspires. Every true work of art has such a central idea, and criticism is imperfect till this idea has been reached and exhibited, and we have been made to see how perfectly the means have been used to reach this end.

The disregard of this principle of criticism has been the cause of many of the false judgments that have been pronounced. The French applied to Shakespeare the rules of the Greek drama, or rather the rules of the Greek drama Gallicised, and found him ridiculous. The English critics applied to the earlier poems of Wordsworth and Tennyson the rules of the preceding school of literature, and found them absurd. It should be remarked, however, in extenuation, that it is sometimes almost

impossible to apply this true method of criticism to the earlier works of a writer of true genius. He has an ideal of his own, at which these earliest works hint, though it is not fully exhibited till his later works have shown what is the common end of all of them. Till then, we have no perfect criterion by which to judge them.

The works of John Ruskin exhibit much of the true spirit of criticism. They are dogmatic; but we have seen that dogmatism is a necessary element of æsthetic criticism. But they are, in many cases at least, sympathetic also. Especially is this the case with his unfolding the various elements of natural beauty. The sky, the grass, the clouds, and the trees seem to have opened their hearts to him. He is in sympathy with them, and puts his readers into the same sympathetic relation. Thus, having reached their heart, we enjoy them as we had never done before.

The third division of æsthetic science has already been stated to be that which refers to practical artistic creation. This, however, can by its nature have little place in a treatise on logic. For its rules are either technical on the one side, or, on the other, they are as a general thing secret, not to be laid down beforehand, and not present to consciousness, even at the moment of the creative act. The first of these two forms of law, that which we have called the technical, has reference to the peculiar characteristics of the material with which the special art has to do. Thus, for instance, the art of painting involves, first, a knowledge of the coloring elements,

and of the manner of imitating solid objects upon a flat surface, or the laws of perspective. Secondly, it involves a knowledge of the relation of colors to each other, their harmonies and their contrasts, so that the picture produced may be pleasing to the eye, even without regard to the objects represented. The same is true of the relation of forms. These must be understood, so that the mere massing of the objects in the picture may have a pleasing effect. This involves the knowledge and the study of composition. All of such laws are in a great measure technical, and to a great extent inductive rather than deductive. On the other side, we have the act of creation, the originating power, all that marks and constitutes what we call genius. This is, in its most perfect operations, the spontaneous action of the mind itself, unconscious of rules, working merely by its autocratic power. Some writers, indeed, tell us the process by which their works have been designed, as Edgar Poe has done, in the case of his "Raven." But such statements are to be received with great caution. They are often mere after-thoughts, and, at best, the essential element of the process has escaped them. If any one doubts this, let him try to create a similar work by the same recipe, and he will find that the most important part has not been told him. Such a grand, original work, formed without rule, often in defiance of pre-existing rules, becomes itself the source of rules that are derived from it, as the laws of the drama were derived from the Greek tragedy. Such laws hold good, until some new, grand, original work has set them at naught, des-

tined itself to become the authority for a new code of laws. This act of creation is, although unconscious of itself, a deduction from the inherent æsthetic sense, which determines the material to be used, and the end to be sought. Æsthetics can only recognize this power, but cannot control, or, to any further extent, explain it.

CONCLUSION.

We have thus examined, as far as has been necessary for the purposes of this work, the principles of deduction from the fundamental propositions of the reason, namely, those of truth, goodness, and beauty. If it be objected that in what has been said there has been much reference to deduction from the propositions of the understanding also, and that many of the processes described are simply those of induction, this is freely admitted. In explanation it may be stated, first, that these diverse elements are so mingled that one cannot be considered wholly apart from the others; and, secondly, that the object of this discussion has been in part critical. The object was to determine, not merely the method of this form of deduction, but the limit of its use. Having accomplished this, so far as is possible within our present limits, we will now proceed to examine the nature and methods of the deduction that is based upon the propositions of the understanding, or, in other words, upon the results of previous inductions. We have no longer vast outlooks into absolute truth, but hardly less serviceable surveys from each fresh

point which the understanding has reached in its toilsome ascent.

B. — DEDUCTIONS FROM PROPOSITIONS OF THE UNDERSTANDING.

Each new generalization of human thought becomes, by degrees, the source of numberless deductions. These first prove the new generalization, and then make it useful in its application to all possible relations. In these two operations consists the importance of this form of deduction. The first is that of proof; the second is that of application. For instance, the stupendous generalization of Newton, by which the motions of the heavenly bodies were brought into the same category with those of falling bodies upon the earth, became the source of deductive reasoning applied to the movements of the heavenly bodies. The result of this reasoning was compared with the actual movement and position of these bodies. The coincidence of the two results proved the truth of the generalization. After such experiments had settled beyond a question the truth of the grand principle, then it became a centre of light which radiated in all directions. It gave the law to the planetary movements. It disclosed new planets. It was established as the unquestioned ruler of the heavenly spaces. In like manner, every discovery is fruitless until it has thus been made the origin of other discoveries, and has submitted to this manifold application. Thus it is, that each new, grand discovery introduces a change into all departments of science. It will thus be seen

how deductive reasoning fills a very large and necessary place, even in the sciences which we call inductive. The broadest generalizations of induction would be barren, if it were not for the multitude of new truths which deduction draws from them.

But while deduction is thus a vital element, even in the inductive sciences, yet it becomes a hostile element, a clog and a dead weight to science, when it is in excess. Deduction binds the generalizations of the past, as by innumerable cords, to the familiar objects of life. The growth of science consists in the pushing forward of its generalizations. No point reached is a final point. We have, thus, two antagonistic forces,— induction pushing forward a generalization, and deduction holding it back by these bonds of attachment to known and familiar facts. Thus every new generalization breaks up habits of thought, destroys the applicability of terms, and disturbs the whole system that rested upon the generalization which it supplants. Thus any mind in which the deductive faculty or habit is in excess dreads anything that shall make uncertain the premises which have been the source of its reasoning. Especially will the deductive habit oppose the new generalization when it concerns any religious or political belief, anything on which not merely systems, but institutions, depend. It will be noticed that it is the same element which is most hostile to the fresh results of induction that clings most tenaciously to the same results after they have been long established, being in all cases simply a conservative force. From what has been said it will be seen that any epoch or peo-

ple, in whose thought the deductive element is in excess, will be barren, to a great degree, of new results. Its foundation premises will be held immovable by the complicated structure that is reared upon them. While at the same time, as the sweep of deduction becomes larger and more unbroken, the same difficulty that we found in deductive philosophy will manifest itself. The results will, namely, become more and more abstract and valueless the further they are removed from their source. Thus the mediæval age, in which the scholastic system ruled, was to a great extent barren of new and valuable discoveries.

Another evil of an excess of deduction in science has been well shown by Mr. Buckle, in his admirable though merely incidental discussion of the subject, to be that it lessens its popularity. The common mind cannot grasp its results. This is true in proportion as the premises are removed from the common thought or knowledge. Inductive science builds up its results in the very sight of all men. Its materials are such as the mass of people can understand. Its facts lie very near to them; while, on the other hand, deduction, taking its start from some inaccessible height, follows a path which to the popular apprehension is vague and unreal.

A true, fruitful, and progressive science depends, then, upon a certain relation of induction and deduction. Too little deduction would deprive the fairest discoveries of their best use and beauty. When, however, the deductive element is in excess, it takes from science its elastic and progressive force, and at the same time deprives it of its legitimate influence

for the instruction and elevation of the popular mind.

We have now to consider the different kinds of deduction, varying according to the nature of the premise, and make some suggestions in regard to their value, their use, and misuse.

In the first division of this work, we saw that the universal may stand to its subordinates in one of three general relations, namely, statical, dynamical, or organic. As deduction proceeds from the universal to its subordinates we shall have to contemplate it under these three aspects. In the first of these relations, namely, that of the statical universal, all that will concern us here is the category of quantity, or numerical wholeness. Quality here only concerns us as cause, and its relation thus becomes dynamical. We have, then, these three forms under which the premises of our syllogism may be comprehended, namely, of quantity, of causation, and of organic wholeness.

a. — STATIC.

The proposition, already so often referred to, All men are mortal, furnishes a type of the quantitative universal. From this, provided it be accurate, results of absolute certainty may be drawn. Whatever is true of all units of a certain class is true of each one of them taken by itself, or of any number of them taken together. It is this absolute certainty that has given its distinguishing glory to the syllogism. All that is necessary is, first, that the premises be true, with which, however, the deductive process

itself is not concerned, it being left to induction to establish the truth or the falsehood of them; and, secondly, that words be used in the same sense and with corresponding limitation in the different premises. When these two points are established, we have in the result absolute and indubitable truth.

It will be obvious that it is only the most general propositions that admit of this use, and herein consists the barrenness that has been ascribed to this form of reasoning. As it is a fundamental truth of mechanics that force and velocity are antagonistic, what is gained in force being lost in velocity, and the reverse, so it is a fundamental truth of logic, that we have found already exemplified in mathematics, that absolute certainty stands in a direct ratio to abstractness. Absolute certainty and concreteness stand in an inverse and antagonistic relation. This quantitative deduction is, however, useful, even when it does not reach the point of completeness in the first proposition, and of certainty in the result. In this case the result will be a probability, great or small, in proportion as the premise does, or does not, approach an absolutely universal statement. Thus, if almost all warm-blooded creatures are land animals, there would be an immense *a priori* probability that any particular warm-blooded creature lived on the land. On the other hand, if nearly all sea-creatures are cold-blooded, there would be a similar probability in favor of any particular sea-creature being cold-blooded. Neither of these probabilities, however, would approach the certainty with which we could argue from the premise that no warm-blooded creature could

live wholly under the water, to the result that this particular warm-blooded creature could not. As a major premise which is almost universal leads to a probable result, so one that is merely indefinite leads to a possible result. A child says she has seen a cow without horns. The other children do not believe it, and appeal to you. You say, Some cows have no horns; therefore the one she saw may not have had any. Strictly speaking, if we know the exact degree of universalness that there is in the first proposition, we have the proportion for the probability of the result. Thus, if nine-tenths of the units comprehended under the class B belong to the higher class A, there is a probability of nine to ten that any one individual b of the class B belongs also to the higher class A. This general statement must content us here without tracing out its possible and obvious complications.

The probability and possibility which we have found to spring from the greater or less universality of the major quantitative premise furnishes a basis of action, though not of scientific truth. The truth of the statement, Some men are sharpers; therefore this man may be, puts every one on his guard in dealing with a perfect stranger. The almost infinitesimal probability reached by the statement, A very few houses are burnt in a year; therefore mine may be, leads the cautious householder to obtain an insurance policy. We are, however, approaching already the subject of the universal as cause, to which we will now fully turn ourselves.

b. — DYNAMIC.

Every object is practically an assemblage of qualities. These qualities are simply the methods by which it acts and reacts on surrounding objects. These, which we may loosely call primary qualities, producing certain effects upon surrounding bodies, give rise to what we may call secondary qualities. Thus, sugar is sweet, and thereby pleasant. Gunpowder is explosive, and thereby dangerous. Thus, from these which we have called the primary qualities branch out others, and through these others, in an almost endless progression. Deduction, in its relation to the dynamical aspect of bodies, consists in tracing out this chain of cause and effect. From the primary or secondary qualities of any object or action we prove its utility or its efficiency, its fitness or unfitness, for any special relation. These primary and other qualities occur in groups. Thus the process of deduction is not a simple one. If a thing had but one quality, and thus produced only a single effect, the work would be an easy one. But as it is, it must always happen that, for any particular purpose or relation, these chains of cause and effect interfere with each other. One quality will tend to fit the object for this end; the other will tend to unfit it. Thus we have open to us opposing lines of deductive reasoning. We are confronted by that antinomy which we have already found so liable to meet us in deductive reasoning. In fact, in deduction from the propositions of the understanding only those which involve purely quantitative relations are free from this. Though

this peculiarity of deductive reasoning has been often overlooked, it is the great hindrance to its absolute reliability. It is this element in reasoning that puts it in the power of religious, political, and other charlatans to deceive and mislead the people. It is this, also, which is the occasion of the very common one-sidedness of thought. Take, for instance, the matter of a protective tariff. Such a tariff has two aspects: one towards the manufacturing interests of a country, the other towards its commercial interests. Thus we have an opportunity for two utterly antagonistic arguments. One adopts this form: The development of manufactures is essential to the interests of a nation; a protective tariff helps the manufacturing interest; therefore a protective tariff contributes to the national prosperity. The other argument is in this wise: Commerce is essential to the prosperity of a country; a protective tariff obstructs commerce; consequently a protective tariff is injurious to the prosperity of a country. I have put these arguments loosely together, as I have done in the case of other illustrations, not affecting the precise syllogistic accuracy.

This full form can easily be constructed by any reader who cares for verbal strictness. From what has been said, it will be seen how each of these arguments is in itself satisfactory, and could easily pass itself off for the entire truth. A person listening, for the first time, to either would feel it convincing, and those in the constant habit of hearing or using either would feel it unanswerable. Each is in fact not answered, but rebutted, by the other. This

antagonism is not peculiar to this case, but makes its appearance in almost every other similar one. In any projected undertaking, one person will urge the advantages of it; another its difficulties. Perhaps it is a case of proposed war. One person, or party, will paint the injured honor of the nation, or its restricted interests. The other person, or party, will paint the horrors of war, its suffering, and its cost. Such illustrations might be accumulated endlessly. In fact, this partialness forms the staple of the great mass of argument. Arguments do not so often confute each other, as, starting from different premises, undertake to overthrow each other by their momentum. Rhetoric, or at least the rhetoric of oratory and persuasion, consists in the effort to make the quality selected as the basis of the argument so attractive that it will be stronger than any antagonistic one. It seeks, in fact, to emphasize this quality so that every other shall be forgotten. In the case of the tariff, the rhetoric of the one party will paint the advantage which will come to the country from the prosperity of the manufacturing interest, and the evils that would spring from interference with this. The other party will spend the same rhetoric in painting the glory of the maritime interest. In case the qualities lie on different planes, the effort is to make the listener rise or sink to the same plane as that on which the speaker stands. It may be that one side objects to the moral quality of an action. The other side urges its practical advantage. The two cannot meet. The one seeks to lift the hearer up to the high plane of moral sentiment; the other to drag him down

to the lower one of self-interest. This antinomy is in some degree recognized. The proverb says that every story has two sides. But yet it is far from being generally perceived that it springs from the very nature of deductive reasoning. The recognition of this fact would do very much to make men independent of one-sided reasoners, and fit them to approach impartially the questions that rack the popular thought.

What has been said would seem to leave this form of reasoning and its results in hopeless confusion. Yet it is precisely on this dynamic deduction that the great practical interests of life depend, and every act is the fruit of one or another such train of reasoning. Persons are so constituted that one quality of an object takes hold of them more strongly than another; or they may have been educated into a certain relation with one form of qualities, rather than another, so that arguments drawn from these especially move them. Men are more or less one-sided. Each represents, more or less, a partial idea. It may seem, then, as if such reasoning were useless; as if there were no absolute criterion of truth. But, first, it is by the means of this partialness that the whole nature of an object, or institution, or truth, becomes brought into play. One man bases his reasoning and his actions upon one interest, another upon another, and thus each has justice done it. Secondly, so far as these diverse qualities are upon different planes, as, for instance, one on the moral and the other upon the selfish, the properly constituted and educated man is adapted to these, so that each class makes its due emphasis, and

has its due weight with him. And, thirdly, so far as these different qualities are on the same plane, deduction cannot, indeed, solve the difference between them. But she has a powerful ally, namely, induction, which she can call to her aid. Induction, which is but another name for experience, corrects the errors, balances the partialness, and solves the antagonism of deduction. Deduction shows the effects that qualities tend to produce. Induction, taking the hint, shows what effect they actually do produce. From the nature of a protective tariff, for instance, we can paint beforehand certain effects, so far as commerce and manufactures are concerned. Experience alone can show just what tariff, if any, is best suited for the common interests of any given people, at any particular period of their history. The more abstract the reasoning, the less does deduction need this correction. The more complex the relations with which it has to do, the more does it need it. This last principle needs emphasis; for it is often in the most complicated matters that men are most inclined to trust to mere *a priori* reasoning. Thus it would be impossible to number the theories of political economy that have been based on deduction from some one principle, and taken as real, and worthy of complete trust, because they were in harmony with, and result from, this principle. Thus the wise Plato, believing the state to be the one central and all-important element of society, deduced from this starting-point his ideal republic, — a scheme which excludes what is best and most essential to human life, breaks up the family, and runs into all extravagance. In these days, it is

more common to deduce our theories of social life from the principle of the absolute individuality and independence of all men. Relief of the poor, common schools, and public improvement, are, in these theories, excluded from the sphere of governmental jurisdiction. The first point named, the relief of the poor, illustrates very well the nature of such reasoning. Poverty, it is said, is the natural punishment of improvidence. To alleviate it is to encourage improvidence, consequently to increase the evil it is designed to lessen. Those who reason thus represent some of the best thought of the time; yet, singularly enough, they fall into the same extravagance that the fanatics did, who objected to inoculation for the small-pox, because it interfered with the pains and penalties ordained by God. Every natural evil is a penalty for some broken law. If one is careless on the water, drowning is the extreme penalty. To save a drowning man is to encourage carelessness. Ill-health is the penalty for breaking the laws of health. The doctors are rendering nature's laws of none effect. Plato already turned them out of his republic, because they kept along in life those who by good right ought to die off. The reasoning referred to, which is so common in regard to the poor, is simply another instance of the same sort. Doubtless injudicious help does more harm than good. Experience shows us how best we may alleviate the sufferings of poverty, while at the same time we diminish, instead of increasing, its cause. Thus all social theories, whether those which look to the government to control everything, to find work

for the worker and food for the eater, or those which exclude from the sphere of government all such interference and help, all systems based on the selfishness of man, or upon his desire of gain, or any other single principle, need the correction of experience. Political economy cannot, indeed, be a purely inductive science, for the perfect society has had, thus far, no existence. It cannot be a purely deductive science, for, as we have seen, deduction by itself runs into extravagance. It is probably impossible to form a complete system of political economy, till society itself is perfect. But deduction and induction, by their mutual help, can continually advance the science, and cause it to approximate nearer and nearer to perfection. This illustration has been dwelt upon to show how, as the subject of reasoning becomes complex, pure deduction becomes less and less able to sustain itself by its own force, and how it needs the correction of experience, the organization of which in induction we are presently to consider.

It may, however, be objected to what has here been said in regard to the illustration used, that it is possible to form by deduction, if not a perfect system of political economy, yet one practically sufficient. For instance, although selfishness is not the only human trait, and a system based upon it is incomplete, yet, if we look upon government as an institution for mutual protection, we need no other recognized principle. Machiavelli long ago reduced this to its simplest expression, when he said that the prince should rather trust to the fear, than to the love, of his people; for the fear was in his own

power, while the love was not. But even in the punishment of criminals, which is the most common example of this relation of government to the safety of society, there is more than one thing to be considered. The rights of the criminal are to be respected, as well as those of the public. That is, he is to be punished just as much as the public safety requires, and no more. Experience, alone, can balance these two interests. Thus, in all similar cases, deduction is, to a very great extent, the moving principle, but it needs, at every step, the correction of induction.

We have considered static and dynamic deduction. It now remains only to glance at deduction from a whole to its parts, or what may be called organic deduction.

c. — ORGANIC.

Purely organic deduction can hardly be said to have any real existence, for an organism consists of two elements, one static, the other dynamic, and deduction has to do with a single principle alone. Yet none the less do we often meet with reasoning of this kind, which appears plausible, and may be either misleading or confusing. The fallacy which takes this form is that of reasoning from the nature of an organic whole to that of its parts. We have already come into contact with this fallacy, in discussing deduction from the propositions of the reason in general. All the fallacies there considered might be regarded as examples of false organic deduction,

which may be further specially illustrated by supposing some one to reason from the fact that a picture is beautiful, that, therefore, each part of it must be beautiful.

It is in regard to the final cause, that organic deduction has its most important place, though here it cannot stand alone. One must unite with deduction from the final cause, as to what is required for its accomplishment, induction to determine what objects and means would effect these requirements. And such reasoning from the final cause is in danger of proving fallacious, since different means may produce the same end. We meet a fine example of this form of deduction in its real power, in the way in which a general, or a chess-player, knowing the end which his adversary has in view, deduces from that the means he will take to reach it, and thus is able to break up the organization of his plans, before they have begun to execute themselves.

From what has been said, however, it will be seen that organic deduction, in its general uncertainty, and in the fact that it unites the elements of induction and deduction, partakes already of the nature of hypothesis, which forms the natural transition between these two forms of reasoning.

C. — DEDUCTION FROM MIXED PROPOSITIONS.

HYPOTHESIS.

It has been stated that hypothesis lies between deduction and induction, connected with both, yet be-

longing exclusively to neither. An hypothesis is the result of a superficial glance at the facts to be explained, and at the general principles by which it seems possible to explain them. It is thus an imperfect, hasty, and superficial induction, and in like manner a hasty and superficial deduction. One can hardly make an hypothesis, which shall be anything more than a random guess, without regarding both the nature of the facts, and also the general laws already established. The words *hypothesis* and *theory* have often a similar, though rarely, if ever, a quite identical meaning. An hypothesis is a more or less probable conjecture in regard to the cause of any phenomenon. A theory refers to the method or law of the working of any cause known or imagined. Thus the luminiferous ether that is supposed to fill the interstellar spaces is, until its existence is proved, an hypothesis. The method of its undulations is a theory. The word theory further differs from the word hypothesis, in that it is used with less reference to its absolute and certain truth. We speak, for instance, of "Wells' theory of dew," or more generally, of the "theory of dew," although its truth has been established beyond a doubt. Although the words are thus distinct in their meaning, they may often be used interchangeably, as an hypothesis always involves a theory, and a theory often involves an hypothesis. The use of the word hypothesis is sometimes a little doubtful. It is difficult, for instance, to determine the exact point of time when an hypothesis becomes a fact. And further, in speaking of what was once believed to be a reality, but now

known to have been a mere hypothesis, or of what is now known to be a reality, but which was once held merely as an hypothesis, it is doubtful which term to use. Something may be subjectively an hypothesis, and objectively a fact, or the reverse. In what I have to say, I shall use the word very generally, and without any attempt at absolute precision, which is for our present purpose unnecessary.

We have, first, to speak of the use and place of hypothesis, and, next, to give some general suggestions in regard to the formation of them, in the different departments into which they divide themselves.

Hypothesis has been at times considered the bane of reasoning. We now know it to be a necessary adjunct of reasoning. Whether the hypothesis be true or false, it helps to crystallize the formless mass of materials which awaits generalization. It gives an impetus to observation. It gives direction and point to examination. It helps to remember, as well as to see, facts. Isaac Taylor very well compares hypotheses to drawers labelled, "Ready for the reception of facts." Take, for instance, the two theories formerly held and defended in regard to electricity, namely, that of the one fluid, and that of the two fluids; how much have these contributed to the observation and generalization of phenomena. They stood over against each other, like the leaders in the child's game of thread-the-needle, making each apprehended fact decide for one or the other, take its place behind the selected one, and add its strength to the struggle that was to determine its superiority. And though both theories now rest side by side, alike

rejected, yet none the less did they contribute to the progress of the science. Thus do even false theories help on true knowledge. The alchemists were pursuing a phantom, yet none the less did they create chemistry. Columbus was mistaken in some of his theories, yet none the less did he discover America. Thus we might go through the history of science, and show how it has been helped at every step by hypotheses that have been without basis, though not without fruit.

If false hypotheses have done so much for science, how shall we estimate the value of true hypotheses? Many have a notion that in any induction, the reasoner, step by step, approaches the grand result at which he at last arrives. This is rarely, if ever, the case. The reasoner throws himself forward upon some hypothesis from which he may look back upon his facts, and marshal them, This is his πού στῶ outside of the world, from which he moves the world. This hypothesis is rarely an entirely fresh creation. It is in general a simple or modified form of some already recognized principle, unless it be, indeed, a mere x, or unknown term, supposed as the supporter of certain phenomena. Since hypothesis holds this prominent place in reasoning, it is natural and important to have, so far as possible, rules for guidance in their formation, yet as an hypothesis is, by its very nature, in part, an original and fresh suggestion, no rules can very precisely determine the method of its formation, or fix restrictions in the search for it. We shall, however, proceed to bring together certain of these rules, as they have been

suggested by distinguished thinkers, illustrate and criticise them, and add to them whatever may seem necessary to present a complete view of this topic, so far as fits in with the plan and limits of this work. To do this it will be necessary to divide possible hypotheses into certain distinct classes. An hypothesis is simply a possible universal from which we can reason as if it were real. We have already seen that the universal may stand to its subordinate in either of three relations, namely, static, dynamic, and organic. We have thus already made the division that we need. It is very easy to see the importance of this division. The process of arriving at some possible ground of classification common to many distinct objects is very different from that required to devise some possible cause for any number of results.

a. — STATIC.

As in deduction we found the static universal to be quantitative, that is, to be the expression of a generalization which includes all the units of a certain class, as any *number* might include them, so the search for an hypothesis on which to base such a generalization will be the attempt to find a quality which may serve as the basis of such a quantitative universal, that is, some quality which may be made a common term for all the units under consideration.

Herbert Spencer makes a very important suggestion in regard to hypotheses, which is, however, applicable mainly, if not wholly, to that class of hypotheses we are now considering. The suggestion is this,

that to reach such an hypothesis you take terms as widely distinct as possible, standing at different extremities of the series, and what is common to these is very likely to be common to all intermediate ones. He proceeds on this principle to develop a very ingenious and valuable definition of life, taking as his extremes the lowest type of vegetation and the highest of human thought. It will readily be seen how important this principle is in such a process. If the attention were confined merely to vegetable life, growth would probably be the first hypothesis suggested, while so soon as we reach the higher types we find that growth is merely a subordinate element, which, so soon as an animal reaches its maturity, ceases to manifest itself. Looking merely at the higher types, we might perhaps hit upon locomotion as the common term, which, however, fails us when we consider the lower. If, however, we take both extremes, what is common to these will, most probably, be common to all the rest. By proceeding in this manner, Spencer reaches this as a definition of life, namely, that it is the continuous adjustment of internal to external relations.

It is obvious that an hypothesis thus reached can be only very general and abstract. It must often leave out what is most *characteristic* in the class of bodies, facts, and operations considered. For instance, if I wished to distinguish the plays of Shakespeare from other similar works, or, in other words, if I wished to characterize the genius of Shakespeare, I should not seek what is common between the "Hamlet," on the one side, and the "Troilus and Cressida,"

on the other, for, by so doing, I should exclude what I was seeking. For a formal, abstract, quantitative definition, which shall include all members of the class considered, the suggestion of Spencer is a very valuable one. But by putting the lowest examples on an equality with the highest, it reduces all to a level with the lowest; and this, it may be remarked in passing, is a danger to which the science of the time is exposed.

b. — DYNAMIC.

The second kind of hypothesis in our division is the dynamic. A dynamic hypothesis is one which is put forward to furnish a conjectural cause to certain effects. Here, also, have been devised certain rules or principles to guide and control the search.

And, first, Newton, the great master of inductive thought, lays down as one canon that the cause assigned shall be a true cause, *vera causa*. This cannot mean that it should be *the* true cause; for that conflicts with the very nature of hypothesis, this being a step in the discovery of the true cause. Neither can it mean that it should be some already recognized and established principle; for this would be to limit our knowledge to the causes already known, and thus restrict the grand march of science. The rule may be taken in this last sense, however, so far as to imply that, if possible, the hypothesis should be that of some already recognized force. Such was Newton's hypothesis of the cause of the planetary movements. Gravitation was a known force, and the reducing the planetary movements to this was to explain them by

a known cause. Yet, even in this sense, the rule is not universally binding. There are times when an entirely new force has to be devised to explain some new class of effects. Thus, the suggestion of the electric fluid to explain electrical phenomena was the introducing into the scientific world an entirely new and unheard-of agent. To find any absolute value to this rule of Newton, we must take a step further. The scholastic habit was to assign, as the cause of an effect, a certain *quiddity*, which was merely another name for the same thing. Thus we might say that a man is virtuous through the possession of virtue. An object is heavy, *gravis*, through its gravity. Now this is to assign no cause in any true sense of the term. The rule of Newton forbids an hypothesis to be a mere play upon words. Gravity is such a merely verbal explanation applied to weight; it become a true cause when applied to the motions of the heavenly bodies.

Comte, who, with all the imperfections of his results, must be regarded as one of the great organizers of modern science, suggests a rule for the formation of hypotheses, namely, that every hypothesis must be one that admits of decisive proof or negation. That is to say, an hypothesis is only valuable as a step in the discovery of truth, and must therefore be one that admits of final settlement. This rule overlooks the advantage already spoken of, namely, that an hypothesis, true or false, helps to organize crude material. It has also the further difficulty, that one cannot say at first what does admit of proof and what does not. The electric fluid seemed an hypothesis

that must be always a doubtful one, yet now we know positively that there is no such substance. The negative proof is complete; while, so far as positive proof is concerned, we can hardly conceive it possible that the grand hypothesis of the interstellar ether should ever admit of any proof more strong than its complete adaptation to explain all the phenomena concerned. It was, probably, in reference to such hypotheses as these that the rule was first given. Science has, however, gained so much from such hypotheses that the impropriety of the rule has been demonstrated. It is, indeed, impossible to confine science within the narrow limits which Comte thought fitting. He would restrict it to the mere observation of the sequence and correlation of phenomena. The human mind, however, seeks constantly to place a cause behind every appearance, and the gain which science has made thereby shows that, though this tendency is to be kept within due bounds, it is not to be utterly forbidden.

The third and last rule which I shall cite, for the formation of hypotheses in regard to the causes of phenomena, is stated by Whewell in his very valuable and most interesting work on the history and the philosophy of the inductive sciences. Whewell takes the position that we have certain previously formed, or, as he would maintain, innate ideas, relating to time, space, force, etc. His theory of hypothesis is that from these ideas is taken one which is conjecturally applied to the facts under consideration. If it fits in with them, furnishing an explanation of the known, and foretelling the unknown, then it is a true

hypothesis. The principle he insists upon is, that the idea taken for this purpose should be of the *kind* which is befitting the circumstances of the case. As an illustration of the disregard of this principle, we have the fact that the ancients, age after age, failed in explaining the course and relation of the heavenly bodies, because they sought to do this by applying to them ideas of space instead of those of force. That is, they sought to explain them by relations of space instead of by those of force. This rule is, certainly, a very good one. The trouble is that the question is very often just this: From what kind of relations shall the hypothesis be taken? The rule is thus better fitted to criticise mistakes after the truth has been discovered, than to prevent these mistakes in the first instance. Thus, in the present stage of science, it is easy to say that for the explanation of the digestive process the hypothetical cause should have been suggested by chemistry, rather than by any fancied theory of a vital principle. But, certainly, to the first reasoners on the subject this vital principle was much more naturally suggested than any chemical agencies. So, to the ancients, the movements of the heavenly bodies naturally suggested ideas of space rather than those of force. The application of force to the explanation, not only of these, but finally to that of all other phenomena, is a grand era in scientific investigation. But no such rule as has been referred to could have wrought this advance. The great mistiness of ancient thought in regard to scientific matters, and, indeed, the mistiness of much popular thought at all times in the same direction,

results from the confounding of static, dynamic, and organic relations; either a static relation or a *final cause* being often taken instead of a dynamic or efficient cause. Our modern science has practically cleared up this confusion, but logical and speculative thought has been slow to perceive the importance of this accomplishment, or to appropriate its results. And it may be repeated, that while these results may serve to classify and explain the mistakes of ancient science, they cannot be used to condemn it. It is to the efforts of the ancient students of nature, as well as to those of the modern, that we are indebted for this clearing up of the confusion that mingled and obscured these distinct departments.

The three rules just considered have been dwelt upon, more as helps in illustrating the nature of hypothesis, than for any absolute value of their own. From what has been said it is obvious that science is helped by a reasonable hypothesis of any sort, so long as it is held loosely merely as an hypothesis, till its truth has been ultimately settled. Yet as the primary object of an hypothesis is to reach the true cause of an effect, it is almost needless to say that an hypothesis should be something more than a mere guess. Something should point to this particular hypothesis rather than to another. The question here meets us afresh, What is the guide in this search? The answer is, *Analogy*. The reasoner first asks himself, What class of phenomena do those under consideration most resemble, and what sort of cause is therefore likely to be the true one? Thus, glancing over known facts and causes, he gains from this principle

of analogy some hint as to the direction in which he is to look for the required agent. The analogy required for making an hypothesis is, of course, much weaker and more general than that required to prove an hypothesis. The whole subject of analogy will be more properly treated later. It is enough that we now feel our need of this method of reasoning.

c. — ORGANIC. — FINAL CAUSE.

Looking forward, then, for a fuller treatment of analogy, which is the foundation not merely of hypothesis, but of induction itself, we will leave the consideration of dynamic hypotheses, or those which relate to causes, and will proceed at once to the consideration of those which we have classed under the head of organic. These hypotheses relate, not to the active forces which cause certain phenomena, but to the general relations and result of them. They may be best summed up under the general head of hypotheses in regard to the final cause.

There has been of late much question whether the final cause should ever suggest an hypothesis or theory, or should in any way enter into a scientific discussion. There have been periods when this form of hypothesis ran into all extravagance; it is therefore hardly to be wondered at that the reaction should seek to exclude it altogether. It is important to inquire, then, how far the idea of final cause is to enter into our reasoning.

There can be no hesitation in admitting hypotheses based upon the consideration of final causes wherever

the works of man are concerned. Man, we know, is forward looking as well as backward looking. He acts for an object. We thus are not merely allowed, but forced, to recognize this whenever we find traces of his presence and activity. We find, for instance, pieces of flint imbedded in the earth. We at first know not whether they are the work of nature or of man. If they are produced by nature, we have only to consider the force by which they were made to assume their present shape. So soon as they are recognized as the work of man, we take into consideration, also, the end for which they were made. By such reasoning we may discover, or by such hypotheses guess, to some extent even the preceding conditions of the outward world. Thus, Inveresk,* a few miles below Edinburgh, is the site of an ancient Roman port. It is at present situated upon what is merely a shoaling estuary, utterly unfitted to be used as a harbor. The fact that it was selected for a harbor shows that its former surroundings must have been different from its present. We see that the land must actually have risen since the town was founded; that when it was chosen to be a port, the sea, at high water, must have washed the foot of the heights on which the town stands. Thus every track of human life gives occasion to guesses, more or less plausible, to hypotheses more or less certain in regard to their final cause, and whatever may have been connected with this. It is by such hypotheses, mainly, that we build up the history of the past.

* See Lyell's "Antiquity of Man."

If we turn from the history of man to the lower nature, we find that there even the most radical theories of science leave a place for this mode of research. These assume that all organic forms reached their present structure through the influence of surrounding circumstances. It is the peculiarity of life that it sustains itself through all such variations, changing itself in order to adapt itself to new surroundings. Individuals, and even genera, may perish when these changes are too sudden or too great, but up to a certain point individuals and genera change to meet outward changes, and through all these transitions organic life endures. When, then, we find in any animal organization any element that fits it for certain surroundings, we know that these surroundings must have existed; and when we find in such an organization any element, the use of which we do not understand, we have a right to make hypotheses in regard to its utility in the general system. It may be urged, indeed, that such reasoning relates to efficient causes rather than to final causes. If, for instance, the medium in which an animal exists has called out any peculiarities in its organization, this medium is the cause, rather than the object, of the change. But it must be noticed that, allowing the theory of which we have spoken full sweep, the causes referred to can act only indirectly. These changes take place in order that the life may be preserved in its new surrounding. Thus, it is the final cause that we are first to consider; afterward we will discover, if possible, the efficient cause which produced the change. It is by means of

such reasoning that the greatest steps in physiological science have been made. Thus, the valves in the arteries suggested the theory of the circulation of the blood, before it had been discovered by actual observation. These peculiarities in the structure of the vessels, it was thought, could not be without object; and the hypothesis based upon this reasoning was found to be correct. This result was very different from that which would be reached by reasoning as to the course of a stream now dry, from the position of the stones in the deserted channel and the direction of the bed of its old tributaries. In this case we reason to the direction in which the water flowed, by going backward from the effect to its active cause. We know of no object for this flowing, — we only see the trace of it. In regard to the circulation of the blood, we cannot say but that its movements may somehow have contributed to the formation of these valves. Any hypothesis looking in that direction is certainly within the limits of science, and may lead to interesting results. But at present there is, and at the time when the discovery was made there was, no basis for such an hypothesis. The only mode of reasoning in the case was then, as it would be now, that in regard to the final cause. This brilliant result shows what a distinguished place this sort of reasoning has in the development of science.

If from the consideration of individual organizations we pass to that of species or genera in relation to each other, we find still a field for the consideration of final causes. Much may be gained, indeed,

by explaining the higher organization by the lower, the function, for instance, of different parts of the human brain by the gradual development of the brain in the lower orders of animal life; but much is to be gained, also, by explaining the lower by the higher.

The organic world is seen more and more to be a vast and complete system. The lower looks forward to the higher, as well as the higher backward to the lower. The influence of such a relation may be seen in the light which is thrown by embryology upon classification. Of this, Prof. Agassiz has given a fine example, to which a general reference has already been made. There are three orders of insects, namely, that of the centipedes, that of the spiders, and that of the winged insects. What is the relation of pre-eminence in the rank of these orders? The butterfly, as well as every other complete winged insect, passes through three stages of existence, corresponding to the three orders just referred to. It first creeps the ground with the structure of a worm. It then, in its chrysalis state, assumes the structure of the spider, and, finally, appears in its proper form as a winged insect. It is correct to reason from the one series to the other. The separate orders referred to must take rank in the order of their development in the single life of the butterfly. Such reasoning is valid, and hypotheses based upon this form of final cause are helpful.

If we now look beyond the boundary of single and related organisms, the question meets us whether we should still be justified in assuming, even hypotheti-

cally, a final cause as the basis of real or conjectural reasoning. The final cause we found to be originally, and most obviously, connected with matters under the direction of human reason, although we have found a place for it in organic forms without looking at their origin. In contemplating the world at large the question is, Do we find in it the traces of a reason and a wisdom so similar to the best human wisdom that we may assume the influence of final causes as we can in the operations of men? We have not now to decide whether we are justified in affirming the presence and the influence of such a controlling wisdom; but whether there is enough resemblance to this to justify us in hypothetically assuming such wisdom. The answer is obvious, that there is. Whether the hypothesis be true or not, it is yet near enough to the truth to assist us in our investigations and our generalizations. The theory of the electric fluid, though not perfectly answering the conditions of the case, yet did this so nearly that the conclusions reached by it remain valid, though that has fallen. So all that we say now, and all that it belongs to our present object to say, is that the hypothesis of a directing wisdom, similar to a perfect human wisdom enlarged to omniscience, is near enough the truth to be a basis of reasoning and a guide in investigation.

In forming minor hypotheses on this foundation, we must be very careful that we make them broad enough and not too confidently. A form of these hypotheses very common is that which assumes all things to have been created for the pleasure or the profit of man. This assumption is apt to check,

rather than to advance, science. Man is the *organic* head of the lower world. In him we see, in their proper grace and relation, the bodily members, which in the lower grade of animals are apt to be confused and distorted, or at least imperfect. In this sense, man may be held to be the final cause of the creation, just as the perfect statue is the final cause of the previous imperfect forms of it. Man stands at the head of the lower forms of life as their final cause, just as the individual man stands at the head of the embryonic and immature forms that preceded his maturity. But when we look abroad over creation, and attempt to explain, even hypothetically, the existence of everything, from its ability to contribute to the welfare of the human race, we fall into fruitless fancies, and narrow the range of thought and investigation. Especially is this the case when we extend this reasoning from objects in the world to the world itself. It was this overweening consciousness of the supremacy of man that stood in the way of the acceptance of the Copernican system of astronomy, as it also stood in the way of the belief that other worlds beside ours are inhabited. It does not concern us here whether this latter belief be true or false. We are interested in it only so far as it furnishes an example of the application of this perverted and extravagant notion of our own race as being the head of the physical universe.

After having thus established the propriety of reasoning upon the hypothesis of final causes, and having, also, explained the limits beyond which such hypotheses become a hindrance instead of a help, it remains

only to suggest the principle that shall guide to the formation of such hypotheses. This principle is, that while to obtain mere statical or quantitive hypotheses, that is, mere generalizations, that shall include all related phenomena, we have to compare and examine specimens most widely sundered, attending often most carefully to those lowest in the scale; to form hypotheses of final causation, or of organic completeness, we have to look not at the lowest but at the most perfect examples of a given class. In discussing the subject of static hypothesis, we had occasion to observe the result which the former rule, exclusively followed, tends to produce. We saw that by giving the lowest object of a class the same importance that we give to the highest, our science tends to become barren and abstract, and the whole perspective of our thought to be destroyed. This is referred to here to illustrate the entirely different principle we must follow so far as the fundamental and organic relations are concerned. Here we must lay our great stress upon the higher forms and the most perfect examples. By these we can first understand the lower, because it is to these that the lower are in some way or other tending. We need, indeed, all kinds of hypothesis, — the static, the dynamic, and the organic. As without the last our science tends to become a barren and dead level; so without the two former it would become fantastic and visionary. Of all these, the organic hypothesis needs to be managed with the most care and delicacy; yet none the less is it essential to the right understanding of the world. If the world is an organic whole, nothing

can be understood when looked at in its isolation. If it is an organic whole, then each object in it has its peculiar place and significance, yet none the less do the relations and principles common to all come out more plainly in the most highly developed, and, in this sense, most complete forms of its common life. You may learn something of man by studying his embryonic structure and development; but you can obtain more light on the nature of the embryo from your knowledge of the full-grown man, than you can in regard to the nature of man from the study of the embryo. A flower-seed is like a riddle, of which the plant is the solution. Whatever our theories of creation or development may be, *formally*, that is, as parts of one common system, the lower forms of creation bear the same relation to the human type that the embryo bears to the full-grown man. The studies in embryology, by which it appears that every human being passes through forms more or less analogous to the different types of life upon the earth, may not prove any outward law of development, — may not prove that the human race actually emerged from these lower types; but they do prove that the *formal* relation of all is the same as if it did. You can obtain additional knowledge in regard to the human hand and arm by studying the bones of a fish; but you can get more knowledge of the bones of the fish by comparing them with the corresponding structure of man. The discovery of the nervous filament in the lowest forms of animal life in which it exists throws much light on the human brain and the complicated system to which

it belongs, but not so much as it receives from the study of these. Comte observed that our whole idea of the world depends upon this, whether we look upon it from the stand-point of man or from that of the lower creation; and from what has been said it will appear that while statically and dynamically man is only a unit among myriad other units, or is merely a congeries of a myriad units, *organically*, man is the head and completion of all; *organically*, he is the solution of the world's riddle. While thus to form a *static* hypothesis, that is, a guide in a mere quantitative generalization, we seek for what is common in the most widely sundered extremes of the department under survey, to form an organic hypothesis, that is, one that shall guide us in the study of the fundamental and organic relations of things, we must use the higher forms as the key and explanation of the lower.

In addition to the rule just suggested for the formation of organic hypotheses, there is another special guide that must not be overlooked, the same that we found most reliable in the formation of merely dynamic hypotheses, namely, analogy. Having now discussed, so far as our limits admit and our purpose requires, the nature and the formation of hypotheses, we will at once enter upon the field to which they form the transition.

SECOND FORM OF SYLLOGISM.

ANALOGY AND INDUCTION.

It will be remembered that the syllogism has always three terms, which, with reference to their difference

of generalization and subordination, may be styled, universal, particular, and individual. The different forms of syllogism depend upon the mutual relation of these three terms. In the first form of syllogism we have the universal connected with the individual by means of the particular. Thus the structure of the syllogism by which John's mortality is so often proved may be illustrated: - -

Universal.	*Particular.*	*Individual.*
Mortal.	Man.	John.

We know that John is mortal, because he is man, and all men are mortal. This may be more simply symbolized, as before, by the initial letters U P I.

In the second form of syllogism the individual term becomes the connecting link. This form may be symbolized thus, U I P. With reference to the example before referred to, instead of reasoning from the mortality of all men down to that of John, we reason from the mortality of John up to the common mortality of the race. This form of reasoning, it will be seen at a glance, is, as thus stated, much less reliable than the other. In that, when the premises are true, the result is certain. In this the premises may be true, and the result false. Because this rose has thorns, it does not follow that all roses have thorns, any more than because this rose is red, it follows that all roses are red. It would seem at first sight, then, that this form of the syllogism might be thrown away as useless. This would be, however, to throw away the great engine of modern discovery.

For though a single syllogism of this form is, in general, powerless, yet when they are multiplied they become a source of undoubted knowledge. As, however, in this multiplication the extreme terms remain the same, it will be simply necessary to multiply the mean term. Thus, observation of many individuals gives a final and accurate result. Representing, then, these different individuals by different small letters, we may symbolize this process as follows: —

U.	*I.*	*P.*
	a	
	b	
	c	
	d	
	.	
	.	
	.	
	z	

In this enumeration of observed individuals, all of which possess the same universal quality united with the same particular attribute, we at last reach a point where we conclude, without doubt, that the two always coexist in the same individual. We have not direct or indirect knowledge of the mortality of all men. The world is full of individuals, of whose mortality we have no observed proof; yet we have known and read of so many individual instances of men that were mortal, that we do not hesitate to ascribe the same quality to all. This method of reasoning from individuals is called analogy, or induction, according as it is from one or more.

The study of analogy and induction is the study of the methods and safeguards of this reasoning.

Though induction is thus, apparently, the opposite of deduction, yet there is a point where the one passes into the other. Herbert Spencer suggests, very ingeniously, that the difference is only in the number of individuals that have been observed; and this suggestion is true so far as deduction from the propositions of the understanding is concerned. Up to a certain number we reason by induction. When the induction is complete we reason from that result to other examples by deduction. This may be illustrated as follows: —

U.	*I.*	*P.*
	a	
	b	
	c	
	.	
	.	
	x	
	y	
	z	

The above represents the case in which all known examples are used to connect the extreme term, and prove that all P is U; yet it will happen in general that somewhere between c and x this certainty is already reached. We then argue *to* the remaining examples, instead of *from* them. If any individual, I, has a certain particular quality, P, we take it for granted that it has also the more general quality, U; or, in other words, if it belong to the sub-class P, that it belongs to the class U. This transfer may be

thus illustrated. It will be noticed, in the following scheme, that at a certain stage P and I change places, showing that the particular, instead of the individual, is thenceforth the connecting term: —

U.	*I.*	*P.*
	a	
	b	
	c	
	.	
	.	

U.	*P.*	*I.*
		.
		.
		x
		y
		z

Putting a concrete meaning to these symbols, we may write thus: —

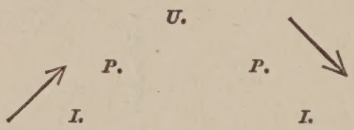
U.	*I.*	*P.*
Mortal.	John.	Man.
	Cæsar.	
	Pompey.	
	. .	
	. .	
	. .	

U.	*P.*	*I.*
Mortal.	Man.	James.
		Peter.
		. .
		. .

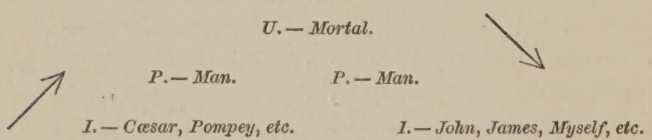
This shows how at first we reason from individuals,

afterward to them, and thus how the second form of the syllogism passes into the first.

Changing now our method of presentation for the moment, we see that in induction the individual is not only the connecting term, but, also, practically the starting point. In deduction, the particular is practically the starting-point, as well as theoretically the connecting link. By the one form we reason from individuals, by the other to them. If we symbolize, now, the actual course of reasoning, as before we symbolized its theoretical relation, we have the following: —



We start with individuals, and reason up to universals; then from universals we reason down to individuals. On putting, as before, concrete realities in the place of mere symbols we have :—



The question now meets us, whether it is possible to reason directly from individual to individual without this intervening ascent and descent; in other words, whether it is possible to reason without the aid of the syllogism. Certainly, we do often

reason from one individual case to another without any *consciousness* of intermediate steps. A child burns himself by a fire. He makes no conscious induction in regard to fires in general, but the next fire that he sees, he is afraid of. Thus do we continually judge a case, or an object, simply by referring to some single experience of the past, without extending our thought beyond the two individual objects or cases. This being so, it has been urged that the syllogism, though useful for reasoning, is not indispensable to it. This objection holds good in regard to the syllogism as it is commonly defined, namely, as a series of propositions, standing in certain external relations; but it cannot be applied to the syllogism as it is regarded in this work. "The burnt child dreads the fire." Why? Because he burnt himself at a fire, and this is also a fire. He does not dread the fire because it is this or that fire, but simply because it is *fire*. That is, from his single experience he has connected the idea of burning with the idea of fire wherever he meets it; and from this general connection in his mind between fire and burning, he dreads every individual fire that he meets. The relations are precisely the same as those illustrated above. These relations come to consciousness as soon as we undertake to defend or to explain the result reached by any rapid and unconscious process like that just described. Then we bring prominently into view the universal term, and its relation to the particular and the individual, by the processes of induction and deduction.

It has been said above, that induction is based upon the observation of many individuals. Before

considering this, we have to notice the application of the second form of syllogism to a result reached by observation of a single case. It is certain that reliable results may thus be reached which have only a single observed instance as their basis. This reasoning from a single individual observation is called reasoning from analogy.

A. — ANALOGY.

Analogy differs from induction only in this, that it is based upon a single instance, while induction requires many facts for its foundation. If a child, in the case just referred to, dreads every fire it sees, simply because it has been burnt by one, this extended result is a case of analogical reasoning. It will be seen at a glance that this form of reasoning is exposed to immense abuse. Because two objects are alike in one particular, or in many particulars, it does not follow, except for some definite reason, that they are alike in any other, or in all particulars. The question then meets us, How shall we find any reliable basis or safeguard for analogical reasoning? We can answer this question satisfactorily, only by taking into account, as before, the difference between static and dynamic relations. By the reasoning from static analogy is meant the assurance that one quality or fact will always be found in connection with a certain group of qualities or facts, although we can give no reason for this association, except that it has been found to exist once. This is the common and popular form of analogical reasoning. We do not know

why certain phenomena are associated together; we do not know which are the essential and which are the accidental elements of the group; we only know that we have seen them associated, and for this reason, when we see several of them united, we expect to find the rest united with them. In such a case as this, according to the numerical proportion of the members of the group known to be present to the rest, is our confidence that the others are present also. The case of the child once burnt, who dreads the next fire he sees, affords a striking example of this reasoning. This fire is in all perceptible respects like the other. Its color, form, and motion are the same. There is no connection between these peculiarities and the power to burn, yet from the presence of these former, he believes that the latter is also present. This is a strong case, yet even this analogy can deceive, as we see in the case of phosphorescent effects, in which there is the appearance of fire without the power to burn. So in other cases there may be some change, some operation, not known to us, by which the force which bound the group together has been removed.

To make static analogical reasoning absolutely reliable, the terms of it must be precluded by the form of the reasoning from the possibility of any change. We rarely find this fully accomplished except in mathematics.

It will, perhaps, occasion surprise if we speak of mathematical reasoning as being a perfect example of reasoning from analogy. It has been already shown that mathematical reasoning differs from ordinary logical reasoning in this, that its propositions are

identical, that is to say, both terms are absolutely equal and alike. It has been also shown that the great certainty of mathematics results from its abstractness, which excludes all possibility that any foreign element shall change the observed relations. A mathematician determines the relation of certain parts of a circle to one another and to the circle itself. He does not need to observe more than one example. From this he is as certain of the universality of his result as if he had observed hundreds of similar cases. The reason of this is, that by the terms of his supposition the statement of his general principle excludes all possible disturbing circumstances. His reasoning is based upon the most abstract definition of a circle. This definition is, by the very terms of its statement, applicable to all circles. Any form to which this definition cannot be applied is not a circle. Any other relation, then, that he sees to be necessarily connected with these in any one case, he knows must be connected with them in all cases; because, by the very supposition, the fundamental relations are unchanged. This example shows the absolute perfection and certainty of which analogy is capable. Induction itself is only the attempt to replace, by the rude and gross force of accumulation of instances, by the mere power of number, the fine and certain connection which, when once discovered, makes a single observation more conclusive than a thousand would be without it. It is, however, rare that static analogy can reach this absolute certainty. The cases where it can are of necessity abstract. In the world of physical agents and of concrete and complicated re-

lations, we need a closer analysis than static analogy can furnish us. We need to discover on which member of any group of phenomena the presence of any other member depends. When we have discovered this, we know that in every case where the former is present, the latter will be present also. This form of analogy may be called dynamic. In analogical reasoning, a single direct dynamic relation of this kind will outweigh a multitude of mere resemblances, however close. Let us look at a familiar example. A gardener may, by some accident, apply salt freely to his asparagus bed. The plants grow larger and thriftier. It is an obvious result from analogy that the same application will profit, in the same degree, other plants. He makes the experiment, and kills them. All the general resemblance between the asparagus and other plants profits nothing, so long as there is this fundamental difference, that the asparagus is naturally a sea-side plant, and thus accustomed to, and dependent upon, salt; while the others are not. So soon as another plant is found which has this peculiarity, no matter how widely it differs in other respects from the asparagus, he may be sure that the same treatment will benefit it. We see, thus, the difference between popular and scientific reasoning and analogy. The one is struck by outward resemblance, and certainly in this way stumbles upon many valuable discoveries. The other seeks the inner relation, the dependence, under one form or another, of cause and effect, and thus moves, not by guess, but by the fair exercise of trustworthy reason.

The discussion in regard to the population of the

planets and other worlds furnishes a fine example of the nature, the difficulties, and the safeguards of analogical reasoning. We only know one world to be inhabited. Our reasoning in regard to the others must be based on what we know of this one; consequently, the argument must remain one of pure analogy. The first point is to reckon up the similarities which the other worlds have to this, and the dissimilarities which offset these resemblances. This planet is round; it has a moon; it moves about the sun; it is inhabited. The other planets, as a general thing, resemble it in the three first points; therefore it is urged they must also in the last. On the other hand, the other worlds differ from this in density, in temperature, and in light. Here we have three points of similarity, and three of difference. Numerically, they balance each other. Let us apply the principle just laid down, and see which set of qualities has most direct connection with the fact of inhabitants. The three first, it must be confessed, have very little. The motion round the sun and the relation to it must have very little weight, so far, for instance, as Uranus is concerned. The sun at that distant planet is very little like our sun. The moon has very little to do with life; and, finally, it is as easy to imagine inhabitants upon a flat surface as on a sphere. Indeed, the natural thought of man finds it much easier to do this, and long rebelled against the notion of a spherical inhabited world. On the other hand, the differences found to exist between this planet and the others are in matters that directly concern life. Vitality is independent of the moon, but it does depend

upon the density of any medium or foundation, and, also, upon light and temperature. Thus far, then, analogy has urged little in favor of the population of other planets. The argument, however, becomes more plausible, as it brings into the discussion the thought of a final cause. The world was created for man. The other worlds must have been created for some end. They are of very little service to *us*. We cannot conceive of any worthy end except as connected with intellectual life; consequently, since we cannot conceive of their having been created in vain, they must have inhabitants more or less similar to ours. On the other hand, it is urged that this argument assumes more than we are at liberty to assert in regard to the divine plan of creation. If we, as before, apply our determining principle to decide between these opposing arguments, we perceive that the nature of the divine plan in regard to man is the important matter to be settled before making it the basis of analogical reasoning. If man be created for a special end; if he have no relation with the lower forms of life; if his whole history is special; if the existence of man be designed to furnish the theatre and the occasion for the grand and tragic drama of the universe, which, by its very nature, forbids repetition elsewhere, then the existence of man upon the earth for such a purpose as this furnishes no argument of analogy drawn from final causes to prove the population of other worlds. On the other hand, if there is not present such a special element and object in his history; if he stand in simply natural relations to the world about him and to the creative power above him, then the fact that

this world is crowned by intelligent life suggests a probability that some, at least, of the other worlds have a similar completion. If you pick some unknown fruit from a tree, and find some excrescence upon the outside, you will at once conjecture that this is an accident which you cannot, with any certainty, expect to find repeated in other specimens. Whatever, on the other hand, you find to be the nature and appearance of the seed or stone of the fruit, you expect to find repeated in every specimen you examine. In the argument of analogy suggested by the final cause, the question is, whether man is a special addition to the world for a special purpose, or whether he is connected with its being, as world? This will depend, as has been said, upon our views of the object for which God created man, and must be always limited by our ignorance of the actual and possible purposes of creation.

We have thus seen that the analogy of final causation gives a much stronger argument for the population of the other worlds, than that from the mere juxtaposition of qualities, yet this argument is affected by our notion of what is the final cause of man's existence, and is weakened by our ignorance of the complete plan of the universe. Let us now apply to the same question the analogy of causation. We find, looking over the whole history of the world, that there has always been a production of creatures of higher and higher grade so fast as there was opportunity for them to obtain the means of life. The water was filled with sea-creatures. As the water subsided, the slimy mud was filled with am-

phibious beings, small or monstrous. Thus at every step the world has brought forth creatures higher and higher, until, when man had a place ready for him, when the conditions of his existence were fulfilled, he took his place, and closed the vast procession. What was the power or the method of this production of life, how the divine agency co-operated with, or made use of, these lower elements, we are not forced at present to consider. It is enough for our purpose that in the outward chain of visible causation life always sprang from the conditions of life. We have here an analogy which may be applied to other worlds, which varies with their variations, which adapts itself to their conditions, which has to do with obvious relations, and is bound to a definite course of progress and of causation. Since the divine power, the creative energy, works with such uniformity of method upon this world, we may reason, with very strong assurance of the truth of our argument, that so far as the condition of other worlds adapts itself to the production of life, so far are they inhabited. The sun, being a mass of flame, cannot be the home of any form of life. If the moon is an arid and volcanic waste, we do not expect to find inhabitants there. If the more distant planets are of thin and watery substance, we should expect to find upon them only aquatic creatures. If Mars resembles very much our earth in its substance and condition, we should expect to find upon it inhabitants more or less similar to the population of our world. And as fast as the watery globes assume consistency, a separate structure of continent and sea, we should expect to find

them occupied by a higher grade of existence. And as the physical history of our world is to some extent necessarily that of other worlds similarly situated, we may expect to find a similar progress in the nature of their population.

This illustration has been dwelt upon at some length, both on account of its fitness to exhibit the nature of analogical reasoning, and also because, in the works entitled respectively, "Plurality of Worlds," and "More Worlds than One," the reader will find the most elaborate examples of sustained analogical reasoning that I am familiar with, at least in the realm of physical knowledge. The first-named of these especially, though not free from fault of method and of result, is yet a very powerful and instructive example. Both present a grand compendium of true and false analogies, which the student of this branch of reasoning may study critically and with great benefit.

A passage from the work of Taylor, entitled "The Physical Theory of Another Life," furnishes a striking example of the application of analogy based upon final causation to the question we have been considering.

If we entered, he says in effect, some vast palace, we should expect to find the variety in its apartments and their uses commensurate with the size of the building; so we may to some extent reason from the vastness of the universe to the variety in the appearance and occupation of the worlds. This analogy from vastness to dignity and variety often fails, however. "It is absurd," says the same writer, "to admit the supposition, that the sun is the mere lamp and

hearth of the planetary system, or only the swivel of its revolutions. This were much the same thing, as if, viewing from a mountain side the distant metropolis of an empire, the gilded domes of which are refulgent in the beams of noon, one were to imagine that the great world is not in that metropolis, but in the dozen of shepherds' huts among which one stands." We now know, however, that the sun is the mere swivel or hearth, and that the vulgar rustics, who were once ridiculed for believing it a mere mass of red-hot iron or stone, were nearer right than those who, looking at its vastness and its glory, believed it a world far more beautiful and spiritual than ours. This example shows that the analogy of causation is more reliable in particular cases than that of final causation.

It will have been seen, from the discussion just passed through, that while analogy may in some cases reach the most absolute certainty, and in others a very strong presumption of truth, yet the range of its power to establish perfect knowledge is limited. It must not, however, be supposed that this limit comprehends the entire range of its usefulness as an instrument of thought. Where it cannot be used to establish truth, it may often be used to answer objections against anything held as true. The objector brings up certain difficulties. The objection is rebutted by showing that the same difficulties exist in matters the truth of which is accepted by the objector. In this use of analogy we find the same conditions which have been just insisted upon. If the objector can show that the difficulties bear a different relation

to the truth which he holds, from that which they bear to the belief which he opposes, then his objection remains with its first force. It will thus be seen that this, which may be called the apologetic form of analogy, is, strictly speaking, only an *argumentum ad hominem*. It concerns only the person addressed, or those who hold the same opinion that he holds. And, further, it will be seen that the result of this apologetic or defensive reasoning would work in two directions, and it would depend upon circumstances whether, provided it had any effect at all, it would make the objector accede to the truth defended, or give up the opinion which he previously held, finding that there were the same difficulties about it as about that which he rejected.

The classic example of this defensive analogy is, of course, the great work of Bishop Butler, by which he defends doctrines which he believes to be those of revelation, by showing that the objections brought against them would apply to any form of natural religion. From what has been said it will be obvious that this work is simply an *argumentum ad hominem*. It adds nothing to the actual credibility of revelation, but is of the nature of a retort, throwing back the objections against it into the face of the objector. Its tendency is in two opposite directions. It is like an entering wedge that presses both ways, but produces its visible effect on the side where there is least resistance. If the theist's faith in his theism forms a larger element of his character than his rejection of revealed truth, this unbelief will be removed by such an argument, supposing it to be unanswerable. If, on the

other hand, his unbelief in revealed truth be more in accordance with his general habits of thought and feeling than his belief in theism, then it will be this belief which will be the sufferer. In the merely apologetic or defensive form of analogical reasoning we have thus an antinomy similar to that found so generally in deductive reasoning. The work of Bishop Butler not only furnishes a fine example of this twofold and antagonistic tendency of the form of reasoning to which it belongs; it also forms a fine study in regard to the other relations of the same form of argument. It has been said above that the force of such an argument from analogy may be destroyed, provided it can be shown that the relation between the difficulties and the thing believed are different in the two cases considered. Thus, if in the subject treated so very ably by Bishop Butler the difficulties cited by him have a different relation to natural religion from that in which they stand to revealed religion, then the analogy proves nothing. For instance, suppose it to be affirmed that revealed religion should be the solution of the difficulties which meet us in our present and actual life, and which make faith in any religion often so difficult, then it is no argument in favor of any system of truth, claimed to be the product of a direct revelation from God, to urge that this system contains the same difficulties which had harassed our simple, natural faith, only more intense and insurmountable. When these difficulties press upon us, we point, for their answer, "behind the veil." But if, when the veil is lifted, we find the same difficulties vaster and more formidable than before, what

resource is left? This example may show how too great resemblance may sometimes defeat the very argument which the analogy was designed to support.

In cases where the facts and the belief which are made the basis of analogical reasoning are fixed and universally recognized, one element of the twofold action of the argument has, of course, no effective and perceptible influence. Of this nature is the analogy, so often drawn, between the passage of the caterpillar through the chrysalis to the butterfly state. Here certainly the facts in the one case are unquestionable. No use that can possibly be made of them, no emphasis of the strangeness of them, of the previous incredibility of them, can destroy the belief in them. If it be urged that the analogy proves nothing, the cases and the results are so different, this must be freely admitted. All that such an analogy can do is to lessen the objection drawn from the difficulty of belief in the possibility of such great transformations in the course of an individual history. The analogy proves nothing. It merely lessens the force of opposition.

This example introduces us into a new division, to which it in part belongs, namely, to analogies which simply aid the imagination. This use of analogy has been already referred to in treating of the Greek philosophy, where it was said that the arguments of Plato, for instance, were more commonly designed to be helps to the imagination than proofs to the understanding. In this department belong the analogies and comparisons of poetry. The consideration of

these is the province rather of rhetoric than of logic. Yet rhetoric springs out of logic; and as before, in speaking of deduction, occasion was taken to show the basis of persuasive rhetoric, so here we may mark, in passing, the foundation of figurative rhetoric. Figurative rhetoric consists in the use of analogy, either for the purpose of illustrating a truth, that is, of giving reality and concreteness to it; or for the purpose of giving to an object or an event some quality foreign to itself, by which it may be elevated or debased. These two uses are entirely distinct. We have an example of the first in the illustration of the strength that there is in brotherly union by means of a bundle of sticks, each of which by itself could be easily broken, but which together could resist a very great force. This use of analogy, though properly belonging to rhetoric, belongs also to logic, and fluctuates between the two. The second use spoken of is illogical and purely rhetorical. It foists, by the means of analogy, into an object or event some quality or idea which does not belong to it. Thus, when a ship in a tempest is said to reel to and fro like a drunken man, we add in our imagination, almost unconsciously, to the ship the semi-consciousness and the bewilderment of an intoxicated man. In other words, we add the human element to the ship. This, it is true, is not asserted of it. The point of the analogy is simply the crooked and unequal course. But because this course is connected in the one case with these human qualities, we receive almost insensibly the impression that it is connected with them in the other also. By this means it is possible to give

to an object or event any aspect that we will, from the most sublime to the most ludicrous. Of the use and abuse of this power it is the province of rhetoric to treat. We merely observe, in passing, the illogical nature of it. We must not omit, however, to state that there is a basis of truth in all such analogical rhetoric. This basis of truth is the fact that there is a certain element of identity common to all phenomena. All are the manifestations of one force. All such figurative expressions as have been referred to imply this more or less clearly. In oriental poetry the profusion of images with which every page is thronged has mainly this object, namely, to bring to light the inner identity of all things, which is so prominent a part of the oriental philosophy and theology.

We have thus far considered the uses of analogy in transferring certain qualities, with which we are acquainted, to certain objects, with whose other qualities we are already acquainted. There is no new element introduced. So far as the qualities are concerned, we do not go beyond our experience. There is only a fresh combination of old material. The question now meets us, whether it is possible by means of analogy to transcend, not merely our experience of the combination of qualities, but that of the qualities themselves. In other words, can we obtain by analogy any idea of an object with none of the qualities of which we have been previously familiar? Suppose, for example, that you have never seen a pear, and I wish to give you some conception of what it is. I have no means of doing this but by analogy.

The object that occurs to me as being most similar to a pear is an apple. I tell you that a pear, in color, in its internal and external structure, resembles an apple, only its shape and its flavor are different. It might seem, at first glance, that you would have no conception in your mind except of a flavorless apple of a peculiar shape. I bid you take your experience of an apple, excepting in regard to its shape and its flavor. The different shape I can describe, but I have given you no conception of any other flavor to take its place; consequently, as has been said, your only clear conception would be that of an incomplete apple. But the fact is, that, though your notion of a pear would be still very imperfect, yet you would have made a positive advance towards it. The mind has the power to hold fast the two or three points which analogy may give it, leaving the other elements of the unknown object not so much absent as indefinite. The familiar definite qualities, and the indefinite ones foreign to our experience, together make a new object, partially defined, yet real to our thoughts. Thus analogy has the power of enabling us actually to transcend our experience, and obtain a partial conception of objects, many of the qualities of which are unknown to us.

In fact, a large portion of our knowledge is of this imperfect character. By far the greatest number of our conceptions are of this nature, which we may call symbolical. Analogy furnishes two or three clear points; the rest of the conception is left vague and indefinite; yet vague and indefinite as it is, it does modify the elements furnished by analogy, and bring us

towards the true conception of the unfamiliar object. Take, for instance, our conception of the solar system. A diagram is shown to us representing the orbits of the planets, or an orrery representing their movements. To these are added certain large measurements of the spaces represented, of which we can form no image in our mind. These are the elements out of which our idea of the solar system consists. Now, it might be plausibly urged that we have no idea of the solar system. For take our thought of a single planet, our image of it is the little ball we have seen in the orrery. This we are to enlarge indefinitely, beyond the farthest reach of our imagination. We have thus an inconceivably large ball. But a ball is a body bounded in all directions by circles. What makes it a ball, therefore, is the nature of its limiting surface. An indefinite, that is an unlimited, body cannot be a ball. In other words, a body, of the limits of which we have no conception, we cannot conceive of as a ball. For the very conception of a ball involves that of its limits. The same may be said of the orbits of the planets. If we cannot take in the conception of the planet, still less can we that of its orbit. In fact, we can hardly make a difference between the two. We cannot make our thought of the orbit larger than the thought by which we strive to comprehend the planet. It might thus be plausibly urged, that the analogy furnished by the orrery has not at all helped our conception; yet, in spite of such plausible arguments, it is true that it has helped us, and we have approached towards a true conception of the solar system. The same reasoning may be applied to our

thought of the earth. A globe gives us by analogy its shape. We see certain stretches of its surface, covered with forest, city, or plain. Yet probably no one can connect these two in one image. When we think of the world as a globe we reduce its size. When we enlarge our thought to take in the multiplied objects that cover its vast surface, we lose the globular shape. Take, for instance, a single part of the earth's surface, namely, the ocean. We stand on the shore and say that we see the ocean. Yet what we see is only a strip of water, which, for anything that reaches our vision, might be bounded at a short distance by a rocky shore. When we think of the ocean, we take what we see, and in our thought extend it indefinitely. We do not imagine it as circling about the earth, but as a plane of vast though indefinite extent. Our conception is always limited, though the limit is undefined, and the ocean differs from other waters in that it has no limit. Yet none the less do we think really of the ocean and of the world. And none the less does our analogy help us towards a right knowledge of them. From what has been said, it will be seen that by the help of analogy we can think truly of what lies beyond our experience, even beyond our possible experience; that our knowledge can extend further than our imagination or our power of complete conception; and, finally, that the imperfect conceptions which we have are, in spite of their imperfection, an approach to true conceptions.

The truths just stated have an extended application to the facts relating to our spiritual nature. The reasoning by which has been shown the imperfection

of our thought of the solar system and of the earth itself is applied to our thought of spiritual things, and especially to our thought of God. The point at present is, not whether such thoughts are true, but whether they are real thoughts. The analogies upon which they are based are so very imperfect, and the relations of them are so changed, that it is urged they amount to nothing, and in using them we deceive ourselves with empty words. After what has been said above, this subject need not be treated at length. As the globular form of the earth and its vastness cannot be united by us in a single complete conception, yet the two together do help us to a true thought of the earth, so the elements of finite and of infinite relations which help us to our thought of God do furnish us with a real thought, whether it be true or not. A merely critical and analytical logic may show these in their contradiction, and maintain that they can merely result in an unmeaning play of words; yet a true and large logic, perceiving that there are similar though smaller difficulties in all our best knowledge, thankfully accepts the clue that analogy offers, and guards only against a misuse of this instrument. Our human love is finite. God is infinite. Contradictions and difficulties innumerable beset the attempt to unite the two in one thought. It does not need a very great power of analysis to bring these difficulties together and exhibit them to the mind that thus, for the first time, perhaps, is made conscious of them. Yet, just as we know that our thought of the solar system is made more clear by our analogy of form or motion, so we are conscious that the analogies implied

in the words infinite love do help us to a thought which is clearer than if we had used no such expression. It is not by means of analogy, but by means of deduction and induction, that we determine whether this thought be true. It is analogy that gives form to the thought, and all our concern here is with the question whether it can thus help us to a real thought and conception. Yet this fact of the limit in the use of analogy must guard us against a misuse of it. Not everything that the analogy might involve can be predicated of the larger object to which it is applied. We must use it in a large and free sense, remembering that it is only an analogy.

We are thus ready, in conclusion, to look at the nature of analogy as running through the whole grand organism of the universe. What we see in one part of this organism helps us to understand the rest, for all are parts of one magnificent whole. This is what we are to understand by the expression that nature is full of "correspondences." These correspondences connect the highest with the lowest, the material and the spiritual. Attraction and love are, as Empedocles so long ago affirmed, the same. In other words, they are the opposite poles of the axis of being. They correspond to each other, and, by analogy, illustrate each other. So the lowest organization may illustrate the highest. The plant and the body of the animal correspond to, and illustrate, the state. In the progress of development and the relation of parts each is the analagon of the other. Indeed, all development, from that of the lowest plant up to that of the highest science, is analagous to all other development. Yet

these analogies from the lower to the higher must be used to illustrate, not to control, our thought of the higher. In spite of the resemblance, the higher must be free of many limitations which hamper the lower. Thus none of these limitations can be made the basis of an argument.

We find an example of the misuse of this argument in the oft-repeated analogy between the state and any human individual. The man is born, progresses through his appointed course, and dies. The state also has its birth, its childhood, its youth, its manhood, its period of ignorance, of faith, and of knowledge. Make the analogy as minute as we will, we are struck by its almost limitless application. Therefore it is often concluded that every civilization must reach its appointed period, and, in like manner, perish. But, as has just been stated, though we may illustrate the higher by the lower, we cannot reason with any certainty from the imperfections of the lower to those of the higher. To do this we must rest our argument, not upon the analogy of similarity, but upon that of causation. We must show that the same cause is operating in the higher as in the lower. Thus, in regard to the necessary death of the state, it must be shown that there is in it the same inherent cause of limitation as there is in the living body. This cannot be shown, for the death of the body results from the fact that a part of its elements are fixed, and a part are constantly changing, and further that the fixed are continually encroaching upon the changeable. Now, in the state this is not true. Its particles are individuals. These are entirely changed

with every generation. Thus from the age and death of an individual we cannot reason with any confidence in regard to the age and necessary death of a nation or a civilization. To prove on such a basis as this, for instance, that the Hindoos can never have a true religion, because their nation has reached the period of decrepitude, having passed through the periods of youthful faith and manly knowledge, is not to use analogy, it is to allow it to run away with us.

B. — INDUCTION.

a. — STATIC.

If I put my hand into a bag of marbles, and pull out a white one, I can argue from analogy, not that all the marbles are white, but that some of them are, for it is not probable that if there were only one white one, I should lay hold of it at the first trial. If I continue to take marbles from the bag, and they continue to be white I first conclude that most of them, and, finally, that all of them are white. If, however, I go from this bag to another, I cannot reason with confidence from these to those. But if, after examining several bags, I find that all contain white marbles, I should judge that all in that collection were alike. Yet, if I should go into another building, I should have to begin my examination afresh. It is easy to see, however, that my conclusions may have been wrong all along. Even had I taken all but one of the marbles from a bag, and all of these had been white, the last might chance to be a black one. This

reasoning from many examples to all similar objects is called induction. The example just given illustrates this in its simplest form. It shows the strength, and also the weakness, of this form of reasoning. Yet it must be remarked, that among natural objects error is less likely to occur than in the example given. In the works of man caprice and mistake introduce variation where we might least expect it. In the works of nature there is more regularity, and our induction may move with firmer tread.

A child that is burnt dreads, by what happens to be a correct analogy, all fire. A person chased by a mad bull tends for a long time, by a false analogy, to fear all cattle. Analogy that is not based on causation can thus go but a little way. Induction, however, even independent of any knowledge of causation, that is, in other words, merely statical, extends far, and gives us knowledge which is almost certainty, which may indeed sometimes amount to absolute certainty. If I see a crow for the first time I should have no right to say that all crows are black, any more than a man who should see for the first time a horse could reason from the color of this one to that of all horses. But after the experience which we have had ourselves, and the information which others have communicated to us, we have no hesitation in saying that all crows are black. We know no reason why they should be so. We only know that it is impossible that if there were white crows we should never have seen or heard of any. Thus it will be seen that the basis of statical induction is what is called the doctrine of chances. The formal mention

of this topic has been reserved to this point, because though static analogy, except in cases that are wholly abstract, depends upon this doctrine, it does not so much as induction involve the careful calculation of chances.

Nothing in the world is produced absolutely by chance. Everything is the result of a force, or forces, acting according to regular law. The relation of one member of a line of causation to other members of the same line is not a matter of chance. There is not, however, the same relation between the members of one chain of causation and those of another. The relation of these last is a matter of chance If John goes to a city on business, his being there is not a chance occurrence. James goes in the same way, by design, and not by chance. But their meeting there was not designed. Neither knew of the movements of the other, and the movements of one had no relation to those of the other. Thus this meeting is a matter of chance.

We often speak of a single occurrence, of which we know not the conditions, and thus do not know whether it will or will not take place, as if it were a matter of chance. By this is properly meant only that it is a matter of chance whether any guess of ours would or would not correspond with the reality. Thus the expression is often used simply to affirm that the matter under consideration is one in regard to which we are in some degree ignorant.

The doctrine or law of chances expresses the method by which we can determine, in many cases, the degree of the probability of the occurrence of any phenomena

with the definite law and circumstances of which we are acquainted; in other words, by which we can actually express the precise degree of definiteness which our knowledge of any subject reaches. This law depends upon our faith in the organic unity of the world, that faith which we have seen to be one of the fundamental instincts of our nature, developed and confirmed by experience. The statement of the doctrine of chances is this: When the tendencies to produce a certain occurrence are equal in different places and times, this result will be produced with equal frequency in all similar spaces of time; when these vary in different places and times, the frequency of the result will vary with them. Of course the obverse of this statement will be equally true, and by the frequency and regularity of any result we may judge of the comparative strength of the tendency to produce it. Thus, we find, in tossing a die, that one face tends to come uppermost as often as another; that is, in the long run, each face will come uppermost one time in six. When this result is changed, — when in the long run one face comes up oftener than one time in six, — we know that the fundamental conditions have been changed, that the die is loaded; and the degree in which it is loaded may be determined by the degree of this frequency. By the doctrine of chances, we discover the permanency or variation of the force that governs the social and physical world. On the certainty of this doctrine the greater part of our science and that of the provisions of our social order depend. The banker, the lawyer, the physician, depends upon it for the assurance of his regular business and support, and the man of sci-

ence depends upon it for the assurance of the truth and permanence of his generalizations and inductions.

The application of the doctrine of chances to induction is this: When we have examined a great number of objects of a certain class, and find them all to possess similar qualities, we believe that there can be small chance that there are any objects of this class which do not possess these peculiarities; for, if there were such, we should have come upon some of them in our investigation. The greater the number of examples on which our result rests, the smaller becomes the chance of any exception, until at last this chance becomes so small as not to affect our calculations. This is the only basis of confidence in what I have called static induction. Static induction includes all generalizations, whether of coexistence or of sequence, where there is no known relation of cause and effect between the relations or facts which the induction decides invariably to coexist or to follow one another. We only know that they are thus united. We know no reason for the union. We cannot explain its causes. We only know that we have always found these elements or facts thus connected, and we reason that we always shall find them so. All of our descriptive science rests upon this foundation. We make one quality or part of the object or animal the mark of a certain class or genus; and we do this, confident that where this mark is found, certain others will be found connected with it. That is, the qualities, whatever they are, we find to be grouped together, so that when we meet one or two, we know that the others must be found also. This was at first

the basis of our astronomical knowledge, though afterwards dynamical relations were mingled with these. In a word, the beginning of all sciences, and the completion of many, rest simply upon observation, or what we have called statical induction. We can give no reason for our results. We only know that they are reliable. What we have always found to coexist, we are confident that we shall always find coexisting.

It need hardly be said that the most careful observation is needed, in order that our results may be worthy of reliance. Yet no absolute rule can of course be given for the limit at which doubt ceases and certainty begins. At any moment the discovery of an exception may disturb the most carefully formed system. But although the point cannot be given at which we may rest assured that our induction is complete, none the less there is a point where the healthy mind takes its result for granted.

Among cautions and safeguards that should be used in this form of reasoning, there is none more important than this, that the more widely the objects to which the arguments point are separated in space or time from those upon which the argument is based, the greater should be the caution exercised in reaching the conclusion, and the less should be the confidence that is placed upon it. In merely statical induction we are working, it will be remembered, in ignorance of the causes that produce the phenomenon which we are considering. All we know is that some such causes are active here and now. But what change even a slight difference in place or time may produce in them, we cannot say. This limitation was foreshadowed in

the illustration with which this discussion commenced. We found that we could not reason from one of a quantity of bags of marbles to the rest. In fact, when we left one bag for the others, our induction had become simple analogy. The same is true of all difference in space or time. What is induction in regard to the fauna of one country becomes mere analogy when we reason from it to the fauna of another. To an inhabitant of Africa a white elephant would seem an impossibility. The King of Siam would not believe the stories in regard to frozen rivers. His induction was correct as far as it related to his own locality. His mistake was in extending it to regions of which he had no knowledge. To return to an illustration used before, it is not actually impossible that a bird may at some time be discovered like a crow in all respects, save that it is white. In this case we should still call it a crow. But the discovery, if ever made, will be in some remote region, where the nature of the climate is different, and which has not been explored as yet by our naturalists. There is the same limitation to statical induction in time that there is in space. The unknown causes of phenomena vary in one as well as in the other, and phenomena vary with them. What is true at one age is not necessarily true at another. Doubtless, at some period, all horses were of one color; indeed, wild animals of the same species are apt to have small divergence in this respect. Thus in one age there may be similarity; in another, difference. This limitation of induction by time is strongly urged by the advocates of what is called the development theory. Nothing is more absolutely established by scientific

induction than the permanence of species. The lines that separate them are impassable. Yet it is urged, by the believers of the theory referred to, that this generalization, however true of the present, cannot be extended back into the uncounted ages of the past, in which the conditions of life, that during the historic period have had a certain permanence, were passing through slow yet almost immeasurable change.

Another limitation of statical induction is that of Kind. We cannot extend our results to objects greatly differing in kind from those which we have actually observed. An example of this nature is found in the difference between mind and matter. Mr. Mill, in his logic, asserts that we can conceive of a world that is not governed by the laws of causation. He seems, however, to find it impossible to believe that mind is not governed strictly by this law. We will not here stop to inquire whether we can conceive of a world not governed by causation, whether such a so-called world would be a world; nor, on the other hand, whether the mind is what is technically termed a free agent. Our point of interest in the matter is simply this, that the induction from objects in the physical world in which we live can much more safely be extended to the most remote physical world, rather than into the realm of mind or spirit. That is, mind is more widely separated from these physical objects by a difference in kind, than the furthest physical world is separated from them by difference in space. All questions in regard to the freedom and other qualities of the mind must be determined by the study

of the mind itself. No induction from the outer world can be extended to it with absolute confidence.

Having thus considered the limits of statical induction, and the caution needed in its use, we have to notice the principle that should always guide and control its use. This is, that its result should be as well defined, as complete, and as minute as possible. It is not enough, for instance, to know that a certain animal, say the gorilla, is found in Africa. We wish to know, first, the limits within which it is found, and, secondly, the size, the shape, the habits, in a word, the whole anatomical structure and external life of the animal, — in what it resembles the ape, in what it resembles man. In fact, the first great difference that strikes us between merely popular knowledge on the one side, and scientific knowledge on the other, is the loose, general, and vague character of the one, and the precise, accurate, and minute character of the other. Science ensures this accuracy by carefulness of observation, by registry and comparison of all results, and by measuring whatever can be measured. In fact, this matter of measurement is the grand element of statical induction. The beginning of many a science dates from the discovery of some method of measurement. Without the thermometer there could be no thermology. Without the gonometer there could be no crystallography. Science thus carries its measurement everywhere. It measures the planets and weighs them. It measures their orbits. It measures and weighs the earth and the sun. It is as accurate in the minute elements as in the vast. It tells us exactly how many pulsa-

tions are needed for the dullest or sharpest sound; for the most dazzling red, or the most delicate violet.

Equally with this accuracy of measurement does it need accuracy of language. It must have a name for everything, — some fixed, hard word, that shall stand for this one thing, and for nothing else. Thus, at first sight, any science is a mass of terms. It would almost startle an ignorant mortal to learn what vast numbers of hard names are needed to define all the parts of his bodily system, which he carries about, as it were, embodied in himself. Poets complain that their sweetest flowers are made to bear the same burden of ponderous nomenclature. Yet this terminology is an essential element of science. It is the record of its analyses and of its discoveries.

When we have said this, we have said all that concerns us in regard to statical induction. It is a vast system of observation, of measurement, and of terminology. Some sciences are mainly confined within this sphere. These are the descriptive sciences, botany, zoölogy, and the like. They have indeed some relations in which they extend beyond this; but mainly they are the result and the record of this vast observation and delicate measurement. Yet these magnificent results do not wholly satisfy us. These measurements, so gigantic or so minute, are only the preparation for the induction that most attracts our minds. It is not enough to see this great world of phenomena existing side by side, with no active relation to each other. We wish to see them at work. The great question of *cause* forces itself upon us. We wish to know the cause of every effect, and the

effect of every object which we know must be in many directions a cause. Static induction is only the introduction to dynamic induction. We may remark in passing, that static induction bears the same relation to dynamic, that we found the *term* to bear to the *proposition*. As the verb brings the objects or qualities that had stood side by side into active relation, so dynamic induction, the induction of cause and effect, reveals to us the forces acting and reacting among the objects which before we had simply observed in the relation of space and of time.

b. — DYNAMIC INDUCTION.

a. — EMPIRIC.

The first results of induction in regard to causation are merely empiric. We find that certain causes produce certain effects, though we cannot tell in what manner these effects are produced by these causes. Thus the empiric form of dynamic induction would rest on no stronger and no different basis than that which is the foundation of static induction, but for the fact that dynamic induction has two advantages. The first is, that instead of dealing with groups loosely bound together, it can single out the active member of each group, the essential element of the union, though it may not be able to explain the nature of its power, or the method of its working. And the second advantage which dynamic induction has over static is, that it can call to its aid the force and the artifices of experiment.

For reaching reliable results by the aid of empiric dynamic induction two methods have been given. One of them is called the method of agreement; the other, the method of difference. The method of agreement watches to see whether, when certain causes are present, certain effects are produced. The method of difference comes with the more searching query whether the effect is never produced if these causes are absent. The two together give us results upon which we can rely. As an example, suppose the question is in regard to the utility of any fertilizer. One man may say that he has used it on his farm for several years, and has always had first-rate crops; also, that he has seen it used elsewhere with the same result. This is the method of agreement. Another man is not satisfied with such proof. He says, Perhaps your farm was of specially good soil, or perhaps you have seen it tried under some other favorable circumstances. He resolves to give a fairer trial. He takes different parts of his farm, and divides each into two sections, both possessing the same soil, the same slope, the same natural advantages and disadvantages. Of these sections he dresses one with the common, the other with the new, fertilizer. He takes account of the seed he plants. He is very careful to expend the same culture on both; and finally makes a careful estimate of the crop gathered from each. Here all the circumstances in both members of each pair of sections are similar, except that in one the old, and in the other the new, fertilizer was made use of. Whatever difference, then, there is in the crop must depend on the different fertilizer used, and if in every case

the result is the same, there can be no doubt of the cause. Thus the loose statement, "I used such dressing and had a first-rate crop," is replaced by the more careful and scientific detail just given. Another familiar example would be this: A man hears that alum will clear the turbid water of his well. He takes some of the water in a glass, he puts a little alum into it, and in a short time the water is clear. He is satisfied with the experiment. One less ready to believe would say, "Perhaps the water settled itself simply by standing." He would place two glasses of the water side by side. Into one he would put alum, into the other he would put nothing. If the one to which the alum is added becomes clear, while the other is still turbid, as this addition is the only difference in the circumstances of the two, to it must be ascribed the difference in the result. From these examples will be seen, very clearly, the distinction between the method of agreement and the method of difference. The first is the source of much of our popular knowledge, and also of much of our popular prejudice. A person observing a certain fact to accompany in a few cases a certain result, takes it for granted, without looking further, that the two are bound together by the law of causation. The very fact of noticing the connection in one or two cases would lead one to notice it in others, and to overlook those in which the two facts occur separately. If, for instance, one has a notion, or has ever heard, that Friday is an unlucky day, he very naturally calls to mind all the unlucky events connected with that day. The list can easily be

made a long one, containing one-seventh of all the misfortunes that come to his knowledge, and the person might naturally make up his mind that there was a connection between the day and these unfortunate occurrences. Thus it is that the method of agreement, hastily used, leads to many false results, which the method of difference alone can corrrct.

A complication often arises from the fact that the same result may be produced by different causes. Thus, how many are the circumstances that affect the weather, or the social prosperity of any community! In such cases, the method of difference cannot be used with perfect strictness. Every one of the circumstances concerned may be in turn omitted or varied, and the result may be still the same. The fact that the result takes place without the presence of the circumstance, which may be supposed to be one of its causes, does not prove that it may not have been such in other cases. The fact that men often sleep without opium does not prove that opium does not often cause sleep. The fact that many men have reached a high degree of mental development without opportunities of education, or of moral development without any definite form of religion, does not prove that education and religion may not be considered as causes of such results. From the fact that under one system of laws a nation has reached a certain height of prosperity, while another, with a different system, has reached the same, it does not follow that each of these systems may not, in the one case and the other, have co-operated to this result. Inattention to this fact is the cause of many popular fallacies and much false

reasoning. The difficulty which this multiplicity of causes, each able to produce a similar result, occasions in the attempt to prove that either of them is actually such a cause, may be met by various methods. One is by that of deduction. We can reason from what must be the effect of a certain cause to what has been its effect, which, however, leads us forward to the department of rational dynamics. Another method is to apply the doctrine of chances. If the two facts are oftener connected than would be the case merely by chance, we judge that there must be some relation of cause and effect between them. In other words, in such cases the method of difference can be but imperfectly used, and we are obliged to fall back, mainly, on that of agreement.

Before leaving the method of difference, there is a modification of it to be considered, required in any attempt to apply it to those natural causes which are permanent, and which thus cannot be removed for the sake of experiment. This modification is called the method of concomitant variations. In experiments on heat we cannot wholly remove the force of heat from any body. We can, however, increase and diminish it. We can study the effect of this change, and thus reach results as accurate as if we could compare the effects of its presence and absence. This method of concomitant variations, though it has been exalted to the rank of an independent method, is strictly, as has been said above, a modification of the method of difference.

There is, however, another method which deserves a distinct place. This is called the method of unex-

plained residuums. I wish to discover the presence or absence of any agent in producing a given result. Other causes have contributed to produce it. The question is whether they alone were sufficient for this end. The method of determining this is to calculate the effect of each of these, subtract this from the common result, and then examine whether there be anything left to require for its explanation the influence of any additional force. Thus, if we were examining a case of so-called spiritual manifestation, we should first seek, and if we found it subtract, the influence of deception. If we found there was no chance for this, or only a very slight chance, we should proceed to examine what we had present as a *bona fide* fact. We should next look for the effects which might be produced in certain temperaments by an excited or exalted state of the nervous system. This might produce a certain fluency and exaltation of speech, not habitual with the individual, perhaps not even possible to him in his ordinary state. This effect is, as experience teaches us, no unusual result of such a state. But we might still find a residuum unexplained. There might be an acquaintance with facts of which the person in his normal state could know nothing. Here we might bring into consideration the force known as animal magnetism. This we know produces a certain *clairvoyant* power, and also renders an individual susceptible to influences from certain persons with whom he may be, by chance or design, *en rapport*. Here, then, we have certain known causes. One is the involuntary and exalted utterances which may be produced by certain abnormal

states of the nervous system. The other is the power of clairvoyance and the subjection to foreign wills, or even to foreign personalities, which may be produced by the mesmeric state. Then, after these have been subtracted, there remains the question, whether anything is left requiring some additional cause. The nervous sensibility of the person whose case we are considering may in its excited state be compared to a sensitive photographic plate, receiving impressions from every object about it. We cannot, as in the photographic example, shut out all influences, leaving only the one which we have to study. We must examine it, and find whether in this confused mass of impressions, produced by the memory or the imagination, or imprinted upon it by the wills, or even by the personalities, of any who may chance to be near, there is also an impression that would require for its cause the influence of some disembodied spirit.

Though this is the first direct reference to the method of residues that has been made in this work, it has been tacitly assumed in all that has been said above in regard to the different methods of induction. The simplest case of the method of agreement involves the method of unexplained residues, for the effect of chance must be eliminated before any result can be reached. This, as was intimated above, comes into very marked prominence in those cases in which the method of difference cannot be tried. Besides the case mentioned above, where there were a multiplicity of causes, each capable of effecting the result under consideration, we have other cases where the forces are not under our control. So many circum-

stances affect the process, and do this in ways so delicate, that although we make in two cases precisely the same preparations, in the one we obtain the end sought, while in the other we fail. This is the case very frequently with experiments in regard to some new agent, especially in regard to one of a delicate nature. At first, it is not known how to preserve the experiment free from foreign influences. It may be that only now and then such an experiment will succeed; but this success may be of so striking a nature as to exclude the possibility of its being a chance product. We exclude all the possible results of chance from our calculation, and have left one or two facts which demand other explanation. This cannot be illustrated better than by reference to phenomena, the nature of which is not yet settled in the minds of men generally, though a belief in their being the expression of some heretofore unrecognized agent has been slowly gaining ground. The phenomena referred to are those which come under the general heads of animal magnetism, clairvoyance, and the like. In these, supposing them to be what they appear, the effects are produced by some force, or forces, which it is impossible for most to control, and therefore nearly all the experiments made miscellaneously must be failures. Thus a person may have dreams all his life, which are mere idle fancies. All the persons of whom he has knowledge may have had the same experience. Yet he may, some night, have a dream which corresponds with minute accuracy to some perhaps painful event that is at the time going on elsewhere. The question to be decided is, whether it is

too minute to be the effect of chance. If, after having eliminated the possible effects of chance, there remain a striking accuracy of detail, it must be supposed that there was some reason for this. It would not follow that dreams are generally reliable, but that sometimes a person may be drawn into sympathy with some distant friend, or may, while sleeping in the ordinary way, fall, spontaneously, into the deeper sleep of the magnetic or clairvoyant state. Thus it is with all those occult sympathies which spring to light very rarely, but then in so striking a manner as to forbid the possibility of considering them merely accidental coincidences. The same is more strikingly true in cases in which the person who may be examining them exercises, by his very presence, a negative and hindering influence. Not only can his own experiments never succeed, but his very presence hinders the success of others. All such phenomena must be studied with peculiar care. Nothing is more remarkable than the fact that phenomena, so perfectly authenticated as those under consideration, should be utterly disbelieved by many. The reason is the difficulty of success in ordinary experiment, and the neglect to eliminate the possibilities of chance from the facts that cannot be denied, and thus discovering the unexplained residuum which demands some additional cause. The student and thinker who would enlarge the boundaries of human knowledge has, in such phenomena, a vast and comparatively unexplored field of research. It is difficult, it is true, to accomplish anything definite and satisfactory in this field; but even in unimportant matters it is the shyness of

the game that gives zest to the chase; and discoveries in the field referred to would do more than almost anything else to shed light upon the most interesting facts and relations of our nature.

Another example of the method of unexplained residues, and one more interesting to the general reader, is found in a process constantly going on in general thought and literature. It is the method often applied on a grand scale and unconsciously. When a man, namely, undertakes to explain some phenomenon by one of the many causes that have co-operated to produce it, his work in its direct object is a failure, but yet he does service, for by showing what this one cause can accomplish he shows, unconsciously, the need of other causes, and also defines the sphere of these others. An example of what is meant by that which has just been said may be found in the famous chapters of Gibbon, which attempt to explain the rise and progress of Christianity by merely natural and finite causes. How far such an attempt might be successful we have not here to consider. What we have to notice is, that whatever infinite and divine cause were working behind and through Christianity, these finite causes were working with it; and the effect of this grand and special cause cannot be seen and understood until we have found how much can be explained by these ordinary and finite causes. Thus such an undertaking as that of Gibbon, whatever its intention and whatever its results, should really be regarded as tending to exhibit the divine origin of Christianity, if it had such a special divine origin, by the method of an unexplained residuum.

These remarks will not be understood as an attempt to give a complete view of the nature and import of these chapters, but simply as using them to illustrate the point under consideration.

Another example of the same kind is furnished by the work of Darwin, on the "Origin of Species." This work, as is well known, attempts to prove from the transformations that all animals are liable to undergo in correspondence with outward changes, and especially from the incorporation of these variations into permanent varieties or species, that all species and varieties of living creatures originated in this way from one common source. This book was received with a great outcry of indignation by those who believed the permanence of species to be matter of scientific, and even of religious, certainty. But whatever our views of this may be, all must admit that the law of natural selection is one of the forces at work in the world. Variations in the structure and habits of animals are continually taking place. However fixed and definite species may be, these variations play about them, and thus we can never understand the true nature and permanence of species, until persistent attempts in the path Darwin has pointed out have proved how much can be explained by this law of natural selection, and thus shown, by the method of unexplained residuum, what must be accounted for by the existence of fixed and permanent species. Another illustration is the attempt to explain vital functions by chemical forces. These forces do co-operate in all vital processes. Whatever may be the special object in the attempt referred

to, its result will be to show, by the method we are considering, what is the extent and nature of the vital force, and without such attempts we should never reach this understanding.

But examples of this sort need not be detailed. We can find them everywhere, in the highest matters and in the lowest; whether it be the application of the sternest criticism to the Bible, or whether it concern merely some trivial matter, every such attempt is, consciously or unconsciously, the application of the logical method of unexplained residues to the clearing up and the making definite of our knowledge. All schools in science or philosophy, all sects in religion, all theorizers who have ability and patience to carry out their theory into detail, no matter how narrow these schools or these theories may be, are yet working out into clear, sharp outline the general sum and substance of our knowledge. Each detaches something from the common mass, and, by the method of the unexplained residuum, leaves more definite and comprehensible the result of other and more general forces.

It must be remarked, however, in concluding what is here said of the method of unexplained residues, that it cannot be regarded as absolutely final. What one analysis leaves, as not to be explained except by means of some special force or agency, a sharper analysis may open, or may even remove altogether, by showing that the force, or agent, supposed at first to be necessary for all, is in reality not needed for any, everything being accounted for by other and more ordinary causes.

b.—RATIONAL DYNAMIC INDUCTION.

The processes we have just studied have been purely empirical. The results of such processes we cannot, except by other methods, explain. We can only say that we have proved them to exist. But dynamical induction is by no means satisfied by such coarse processes and such crude results. It will not only seek by observation to bind together cause and effect; its grandest triumphs consist in showing the *necessary* connection between cause and effect. The empirical generalization must be large indeed that forbids any chance of error, but so soon as we reach these *necessary* relations, we find ourselves on the solid ground. By rational causes is meant causes that admit an explanation of the manner of their working. Of empirical causes we can only say that they are such. Of rational causes we can say *why* they are such. Yet few, if any, causes are wholly rational. Every object and every force has its original nature, by which it produces such and such effects. This nature is an original fact not to be explained. No science of optics, however perfect, can explain why any external combination should produce in us the special sensation which we call red, blue, or green. Our most rational causes are, therefore, more or less mixed. The problem is to reduce the empirical to a *minimum*, and to raise the rational to a *maximum*.

The difference between the two may be readily illustrated. The physician administers quinine for

the intermittent fever. The remedy is purely empirical. He administers it because he has found it to be a remedy in such cases; but of its working, from beginning to end, he knows nothing. When, on the other hand, he prescribes antimony for certain diseases of the lungs, he knows, in part, what he is about. He knows the precise effect which his remedy produces upon the lungs; he knows, also, the precise state of the lungs; he knows, therefore, how his remedy, acting as it does, will relieve them. He does not know the reason for the primary action of his drug. His knowledge of this is as purely empirical as his knowledge of the effects of quinine in the intermittent fever. Yet, in the former case, all after the first step is clear; while in the latter the whole is involved in mystery. The one is in part rational and in part empirical. The other is wholly empirical. When, however, he prescribes iron for some state of the blood, he deals with causes much more purely rational. The blood is deficient in iron; he simply supplies what is lacking to its completeness.

It would seem as if the tracing of the actual transfer of a body from one set of relations to another would furnish the nearest possible approach to a rational explanation of the working of any cause. *The transfer of force*, however, approaches this standard more nearly. A body of whatever kind has its own peculiar properties which are active in all causation of which it forms a part. These qualities are always irrational, that is, they admit of no explanation. They are purely empirical. Force, however, is pure-

ly abstract. It has no qualities. It is susceptible of mathematical formulas. Its presence and its degree can thus be demonstrated, and what can be demonstrated is in the highest sense of the word rational.

Hypotheses may be formed in regard to either empirical or rational causes. An hypothesis that admits of merely empirical proof is, however, little more than a guess. We conjecture that a certain agent may produce a certain effect, and by the method of agreement and that of difference we determine whether it be so or not. So far, the result is merely empirical. It becomes rational, so far as we are able to explain its method, and show why and how this agent produces this special effect.

The course in regard to the verification of rational hypotheses is very different from this. A rational hypothesis is proved to be true when it is shown that it completely explains the phenomena under consideration, while nothing else can be thought of that would do this. To verify such an hypothesis, then, one must develop all the results that would spring from the supposed cause; must examine, most minutely and accurately, all the phenomena to be explained, in all their relations, and if the two results cover each other, that is, if nothing could result from the cause that we cannot find in the phenomena, and there is nothing in the phenomena that cannot be explained by the cause, we are justified in assuming the hypothesis to be correct, and the cause to be a true one. Two or three examples will illustrate what has been said, and also suggest certain qualifications of it.

I have already referred to the fact, that a short time ago it was the custom to explain electrical phenomena by the hypothesis of what was called the electric fluid. This hypothesis existed under two forms. One school affirmed that there were two fluids, which it called respectively vitreous and resinous; the other affirmed that there was but one fluid, and the two electrical states were called positive and negative. Nearly all electrical phenomena were explained with equal ease and satisfactoriness by either of these theories, while the latter, that of one fluid, had the advantage of greater apparent simplicity. Each, however, had its weak point. The theory of the one fluid proceeded triumphantly, till it met the fact that negative bodies repel each other in the same way that positive bodies do. Here the theory of two fluids met the case exactly. The vitreous and resinous electricities each attracts the other and repels itself. The defenders of the one fluid found themselves in difficulty. Franklin, the originator of this theory, confesses that when he originated it he was not aware of this negative repulsion. The most obvious explanation would seem to be, to claim that unelectrified matter repels itself; but this is counter to our common experience, that particles of matter, except when they are forced into too close proximity, have a mutually attractive force. The explanation relied on was this: Two negative bodies do not repel each other, though they appear to do this. They are attracted by the positive bodies which surround them on all sides. This attraction is equal in all directions, except in that where another negative body by its presence replaces and de-

stroys this attraction. Two negative bodies are attracted in all directions except towards each other. Thus they are drawn apart, as if they repelled each other. But while the defenders of the theory of one fluid were forced to this awkward *détour* to avoid a difficulty, they had on the other hand an *experimentum crucis*, which gave their antagonists no less trouble. If a Leyden jar be heavily charged, and its two poles be made to touch opposite sides of a card, yet in such a way that they shall not be directly opposite to each other, we find, when the jar is discharged, this very striking result: from the positive pole there is a line burned, marking the course of the electricity till it reaches the point opposite the negative pole. There is at that point a hole where it has struck through to complete its circuit. From the negative pole, on the other side of the card, there is no such line. The positive or vitreous electricity thus leaves its very autograph. The negative, or resinous, makes not even its mark. We have thus two theories, each plausible up to a certain point, each failing there. This failure in each does not surprise us, now that we know that there are neither two fluids nor one, that there is no such thing as an electric fluid at all, but that what we call electricity, like what we call light and heat, is only a form of molecular motion.

Another illustration is furnished by the long controversy, now happily at an end, between the defenders of the corpuscular and the undulatory theories of light. The corpuscular theory was at first sight the most plausible. It fitted in admirably with the more obvious phenomena to be explained. The precision

and regularity of the movement of reflected light, its apparently smooth and clean outline, its regular rebound, the angle of reflection equalling the angle of incidence, — all of this so completely resembled the motion and the rebound of a thrown ball, that it is not singular that the most scientific minds should have rested content with this explanation. Its first difficulty came with the phenomena of refraction. Why are these corpuscles thrown out of their path on passing from one medium into another of different density? The clumsy explanation, clumsy, though the best that could be devised, was, that these corpuscles were attracted towards the denser medium when they entered it, and thus were drawn out of their course, and moved while passing through this denser medium at a different angle from that which their motion had previously described. On leaving it they are attracted backwards towards it, and thus move on a line parallel to their original course, though on a different plane. Even Newton was so convinced of the truth of the corpuscular theory, from its complete fitness in other respects, that he was satisfied with the explanation of refraction just given. But when the phenomena of polarized light began to be fairly understood, the corpuscular theory had to make use of so many fictions, and such elaborate complications of its first beautiful simplicity, that it was soon given up by scientific men. The undulatory theory had this disadvantage to contend with, that its application to the common phenomena of light was less obvious than to the more delicate. It was very easy to point to a smooth, round ray of light, and ask if that smooth

outline could be the result of undulation. If the undulatory theory were true, light, it was said, would, on passing through any opening, distribute itself at once in all directions, instead of following its straight course until it met with a rebound. With refraction, the undulatory theory was at once at home. Here it needed only the very natural hypothesis, that the undulations were somewhat slower in a dense than in a rare medium. But the undulatory theory found itself most completely at home with the phenomena of polarized light, where its opponent had failed. And, finally, it was at last demonstrated that the lines of light and shade are not clear and smooth. Every shadow has its fringe, and the phenomena of transmitted and reflected light are just what they should be if the undulatory theory were true. But the grand triumph of this theory consists in the fact that it is capable of absolute mathematical demonstration. The undulations can be measured and counted. It is marvellous to what minute accuracy this measurement can be carried, so that we know that to produce the violet ray are needed fifty-nine thousand seven hundred and fifty undulations to an inch. Not only can the number of these undulations be calculated, but all the laws of their interference and their harmonies are susceptible of the most minute and complete demonstration, and the results of this demonstration coincide, at every point, with the facts of the case. The polarization of light, the fringes of shadows, the fact of two rays of light uniting to form darkness, the fact that the brightness of light may be under certain circumstances increased by obstructing and keeping back

portions of it, so that only the undulations that harmonize pass, while those that interfere are kept back, — all of these diverse, strange, and, at first, bewildering phenomena seem only the play-ground of this undulatory theory, such an easy, simple, and beautiful solution does it supply to them all. This is what in these days is called science.

The consideration of these theories of light suggests two qualifications of the principle of rational dynamic induction which was laid down above. The first is this, that when a theory, or hypothesis, becomes more and more complicated to satisfy the demands of fresh phenomena, even though it may succeed in explaining them, it is an indication of its falseness. The corpuscular theory could explain, after a fashion, the polarization of light; but the corpuscles had to be so manipulated to accomplish this that they could hardly hold their own after it. Another example of the same kind is found in the history of the phlogistic theory of combustion. The burning body, it was said, gives out its phlogiston. But closer analysis showed that all the results of combustion, when collected and weighed, are heavier than the body was before it was burned. This seemed to conflict with the theory of phlogiston, for if anything was given out, the body should have lost weight instead of gaining it. But there was never a theory yet that would not undertake to give some explanation of all facts, however contradictory to what it would have supposed. The defence set up for phlogiston was, that it possessed the property of specific levity, so that with it the body was lighter than without it.

Perhaps the most striking example of a theory proved false by its increasing cumbersomeness and complication is furnished by the theory of cycles and epicycles, by means of which the movements of the heavenly bodies were explained by the early astronomers. They, not being able to conceive the possibility that these bodies should be self-sustained, imagined them to be attached to crystal spheres. The revolution of these spheres was supposed to be the cause of the apparent revolution of these bodies. With the discovery of the satellites of the planets, and of the variations in the movement of the various bodies, more crystal spheres and new revolutions had to be added, until at last was produced such a complicated system that the very thought of it is bewildering. It is no wonder that Alphonso of Castile exclaimed, that if God had consulted him he could have suggested a better arrangement. The wonderful thing about it is, that this theory actually did explain all the movements of the heavenly bodies, on the hypothesis that the earth was the centre about which all revolved. If mere success in explaining the facts of any case, so far as they are known, could prove an hypothesis correct, this had that proof. But its complication showed its falseness. How different was the true theory when it came! A single word, and the whole story was told.

The second qualification suggested by the examples referred to is that an hypothesis capable of mathematical demonstration gains thereby the highest degree of certainty. A general knowledge of the movements of the planets and of the moon might

satisfy common minds that the hypothesis of universal gravitation was correct. It was, however, a mere guess, until Newton applied the power of mathematics to the question and settled it forever. He proved that the moon moved precisely so far towards the earth in a given time as it would if it were drawn towards it by gravitation; and yet some would claim for those who had merely guessed the fact of this relation of the heavenly bodies an honor akin to his who demonstrated it. Comparatively few discoveries have not existed as conjectures in the minds of many before their truth was fully demonstrated. The honor of them belongs to him who proves them to be true. A similar example is furnished by what is called the correlation of forces, which is now no longer a theory merely, but a fact. A popular argument for the truth that light, heat, electricity, etc., are only varieties of motion, and thus different forms of one force, can be made from the fact that each may produce, or pass into, the other. Motion, friction for example, produces electricity, heat, and finally light. Electricity produces, or becomes, motion, light, and heat. Heat produces motion, electricity, and light. Whichever you start with, you find yourself having to do with the others. This popular argument becomes a scientific demonstration when the relation between these forces, which we know to be forms of the same force, can be expressed by figures more easily than the relations of gravitation itself. The heat generated by the concussion of a falling ball of lead against the earth may be calculated with perfect accuracy, if the size of the ball and the distance it has

fallen be known. Thus a ball of lead of a given size, falling from a given height, may furnish a standard of measurement for heat. And, on the other side, we have this marvellous confirmation of the theory, namely, that the heat thus generated is precisely what would be needed, if rightly applied, say by means of steam, to lift the same ball to the height from which it fell. This is the perfection of the mathematical demonstration of a rational hypothesis.

It must be remarked, however, that an hypothesis, though susceptible of mathematical expression and proof, is subject to all the other conditions of proof to which other rational hypotheses are subject. It must be the only conceivable power that can lie behind, and express itself through, these mathematical formulas. Moreover these formulas must be capable of various and corroborating application. Thus, the fact that we can calculate the number and weight of the meteors which would be required to keep up the heat of the sun to its present degree, by their concussion against its surface after having been drawn to it from afar by the might of gravitation, does not prove the truth of the theory. If there were, to our knowledge, precisely this amount of meteoric matter falling upon the sun, then the demonstration would be self-proved, like that of the relation between motion and heat, just referred to. Again, the fact that the hypothesis of ultimate atoms is adapted to the mathematical relations of chemical combination, and to those of pressure and expansion, does not prove its truth. This hypothesis is a convenience; but we can suppose another structure of bodies that would satisfy the

same demand. Thus we may calculate the relations of a circle by supposing it to consist of an infinite number of straight sides; but though this is a convenience we do not imagine it to be the truth. So, also, if we may borrow a beautiful example used by Schopenhauer to oppose the atomic theory, we may speak of motion as if it were made up of spaces of rest and motion alternating. A rapid motion we may explain to be that in which the spaces of rest are the smaller; slow motion that in which they are the larger. This is precisely similar to the way in which we explain specific gravity by the atomic theory. If the result is false in the one case, it may not be true in the other. It may serve further to modify our confidence in mathematical demonstration, as furnishing absolute proof of the truth of any hypothesis, to remember that the theory of cycles and epicycles above described was a perfect triumph of mathematical reasoning, though it proved to be founded on an utter misconception of the true relations of the heavenly bodies to one another and to the earth. In fine, all the pre-eminence that can be claimed for the mathematical demonstration of hypotheses exists when it is added to other proof, not when it replaces this.

From what has been said, it will appear that nothing can do more to disturb our absolute confidence in the truth of any hypothesis, than the discovery of another hypothesis which furnishes an equally satisfactory solution of the problem. This is the reason why any scientific or theological school opposes, with so much force, a new hypothesis, which would furnish an explanation of any phenomena, in a manner differ-

ent from the established and time-honored one. The very presence of the new seems to cast doubt upon the old.

C. — ORGANIC INDUCTION. — INDUCTION OF FINAL CAUSES.

In another place the propriety of forming hypotheses based upon the notion of final causes has been considered. We have now to consider the kind of proof and of certainty which belongs to this field of inquiry. It must be confessed that the passage from dynamic to organic induction, from the study of working or efficient causes to that of final causes, is like that from the clearness of day into the dimness of twilight. Every man who ever acted from a purpose and for an end is certain of the existence of final causes. Still, in special cases, we have not as a general thing a clear, mathematical demonstration of their existence and of the manner of their operation. In dynamic induction, as we have seen, the more minute our search the more certain becomes our result. In regard to organic induction, though we may be sure of general truths, yet the more minute our search the less sure we are of our ground. The great difficulty in regard to the study of final causes is the fact that they are always mingled with dynamic causes. A final cause has no objective existence except in its result. This result has been directly produced by efficient causes. The final cause has only been working invisibly behind and through these. Now, not only does a difficulty arise from the fact that a final

cause can accomplish itself only through the medium of dynamic causes, — another difficulty arises from the fact, that when the two work together it is always through a relation of subjection on the one side and control on the other, which is constantly liable to be disturbed. Thus, though we are sure in any case that the final cause is present, and is in fact guiding the whole process, we may be doubtful, in any special stage of the process, whether any particular phenomena are the results of the final cause, or whether they are simply produced by the efficient causes freed, for the moment, from the guidance of their superior. We often find, indeed, the presence of the final cause where we have no conception of the nature of the efficient cause. This is the case in regard to nearly all the productions of organic nature. Yet we know that in all such cases there is an efficient cause, and as Schopenhauer well remarks, though he supports his remark by unsatisfactory illustrations, our perfect knowledge is reached when we are able to give account of each. After these general remarks, we will proceed to consider final causes in their special forms.

In regard to all actions that are the result of mind or intelligence, we know that there must be a final cause. Intelligence is the acting for a final cause, and thus every intelligent act must have such an aim. Our difficulty arises when we come to determine what was the final cause of any particular act or series of acts. In legal investigations this is often very important. If a man is accused of any crime, say of murder, or of assault, or of incendiarism, it is a very important point

to show that he had a motive. If the accused was known to bear malice towards the injured party, or if he has had reason to bear malice, or if he could have sought an opportunity for robbery, such a possible final cause gives point to the other circumstances that tell against him. Through its influence, facts that might otherwise have been passed over assume grave importance. Of equal moment with the deduction of an act from this possible final cause, is often the induction of the final cause from the circumstances of the act. Thus suspicious circumstances which tend to implicate a man in any crime lose their dark shade often if they can be explained by any other motive than that which the crime would furnish. A skilful lawyer has often saved his client by the suggestion of some new motive, which might run through the whole line of circumstances, that, strung upon a different thread, looked so formidable, and give them an entirely different aspect. Indeed, the skill of an advocate is shown in hardly anything more than in the manner in which he marshals the various parts of his testimony, so that they shall be linked together in such a manner that they shall of themselves force upon the listeners the purpose by which he would explain them. Such arrangement of testimony is more powerful than an argument, for in it the advocate is out of sight. There is art, but there is no appearance of art. In an argument the listener braces himself against what he sees to be the object of the speaker. But in listening to this skilfully arranged testimony, where each point stands out in the relation to the others which the advocate wishes, one is like a man who takes a

forced card from the hand of a juggler, sure that in this there is no trick, for he picked out just the card he had himself selected from the pack. Another form which the question of final cause takes in legal tribunals relates not to the fact of the commission of any felonious act, but to the degree of evil which the act was meant to accomplish. Suppose the fact of murder proved, then comes the question whether it was intended or not. The law has a rough general maxim that decides such questions, other things being equal, by the nature of the weapon by which the assault was committed. If it was by one that would naturally produce death, the man is held accountable for the act. If it be one that would not ordinarily produce this result, it is not insisted that the man could have foreseen it in this case. Maxims like this are rules, rough and rude, which may be convenient in many cases, and may furnish a greater approximation to truth than could otherwise be reached. It need not be urged, however, that such rules should always be subsidiary and subordinate to more accurate and delicate methods, where these can be employed. Another example of the manner in which a general rule, based upon the nature of final cause, is used to settle delicate questions of fact, is furnished by the science of biblical criticism. It is one of the canons of criticism, that in case of any divergence between the reading of the oldest manuscripts, other things being equal, the preference shall be given to the reading that is the most obscure. It is believed that as these manuscripts were copied by one and another, it was easier for an obscure reading to be

replaced by an easy one than the reverse. The disposition to clear up the sacred text would work almost insensibly to this end. Thus the first result and object of these critical labors is, contrary to the popular impression, not to remove difficulties, but to increase them.

Besides judicial and private judgments of actions, and these problems of minute criticism, the larger questions of history demand often a similar solution. The heroes and great actors of history not only excite our curiosity as to the circumstances of their lives, but also create an intense interest to know the motives which actuated them. When we see the origin of great discoveries, the originating of new eras, the commencement of epochs of good or evil, we demand to know how far the chief actors in such events were conscious of the parts they were playing. We wish to know how much blame to award to the workers of evil, how high honor to the accomplishers of good. We can hardly help judging men by the light of their achievements. We cannot shut the grand results from our own thoughts, nor, in our imagination, from the minds of their originators. The two ships that the same year brought, the one the first slaves to Virginia, the other the Pilgrim Fathers to Massachusetts, we can hardly look upon as chartered by persons seeking merely, or mainly, immediate results. We see the one freighted with the shame, the other with the glory, of the Continent. We are often disappointed when we find that these grand results were not present to the minds of their authors. Our Pilgrim Fathers did not seek consciously to found a republic

of equal religious liberty for all. They sought religious liberty for themselves. When we consider this, we are tempted to take from them much of the glory of the achievement. The fact we are considering becomes yet plainer to us in the history of scientific discovery. We find how little the discoverer often knew of what he had accomplished; and how little of this he had foreseen. Galvani discovered the galvanic power. We approach the act of discovery expecting to find a certain preparation and foreknowledge. We find the philosopher simply puzzling his head to know why the leg of a dead frog should kick so unaccountably in his kitchen. Columbus, we say, discovered the New World. We are a little disappointed when we find that he did not undertake any such discovery; that he even died without the knowledge that the land he had found did belong to a new continent. As we look more closely, however, at the final cause which controlled such events, we incline to pay back to such founders and discoverers at least a part, and a large part, of the honor which we had taken from them. They took the path without knowing indeed the grand issues to which it would lead; yet they took it, seeking results similar in kind to those actually reached. They were on the path of improvement and discovery, and the fact that they did not beforehand comprehend its whole length does not take from them the honor of choosing this path. Galvani was not seeking what we call galvanism. He was seeking a knowledge of the forces at work in nature. Columbus did not know of a New World, but he did consciously make use of the fact of the spherical nature of the

world to seek what lay on its other side. The Pilgrim Fathers did not seek to found a republic of absolute religious liberty, but they did seek to found a republic in which religious truth should be the groundwork of its strength, while to this religious truth they sacrificed all that was dear to them.

This consideration of final causes, as they actuate individuals, leads us to the perception of a certain plan, a grand final cause, which is working through the events of history, so that an apparently slight event proves to be the germ of some vast outgrowth, which can only be comprehended after the result. Thus we see individuals to be only the instruments in this great progress of an organic history. We learn also to honor individuals, so far as the final cause which actuated them can become one with, and absorbed into, the great final cause that is controlling the march of history. We find thus in the great men of the world a sort of instinct, like that which leads the lower animals to prepare for a future of which they have no knowledge. The young bird builds its nest, knowing nothing of its future brood; or wings its flight across continents and seas, knowing nothing of the more genial climate that shall meet it at the end. Thus the great minds of the world seem to act for some future which is not fully conscious to their own thought.

This brings us to consider the strange manifestation of the working of final causes, as we find them in the life of the lower creation. That animals reason, that is, that they plan actions for a certain result, we cannot doubt. A dog seeks warmth and food with no

less clear notion of what he is about than that which impels his master to the same ends. Yet we find another power present in animal life, most present in the lower forms of animal life, which is as unquestionably the operation of final causation, while yet the object of the act is unknown to the creature performing it. Thus the young spider spins his first web. Thus do insects seek the fitting locality for the deposition of their eggs. The moth plans for the food of its young, whose nature and whose appetite will be so different from its own. Such instinctive acts are more difficult to be distinguished from acts of reasoning, when we find that new circumstances are met and provided for by them. Thus in Kirby and Spence's "Introduction to the Study of Entomology," we are told of humblebees, which carefully propped up with wax a piece of comb that had, for the purpose of experiment, been placed upon its edge, or smallest side, in such a manner that it tottered with the movements they made upon it, and was liable to fall. These artificial props, which the bees could never have needed to make use of in their natural and wild state, which perhaps no creature of the class had ever used before, were introduced with as much skill and adaptation to their end, as if they had been a part of the machinery regularly employed by these insects. Schopenhauer gives a good method of understanding such phenomena, when he compares instinct to a magnetic clairvoyance. "The young spider," he says, "*feels as if it must* spin its web, although it neither knows nor understands the object of its work." So he relates, among other similar examples, the story of

a man upon the ocean, who felt of an evening impelled, without any reason, not to undress himself, and who thus stretched himself in his clothes, boots, and even spectacles, upon his bed. In the night the ship took fire, and he was one of the few that escaped. He illustrates this form of instinct further by comparing such necessary, though not understood, acts to the organic growth of the body. As some creatures develop claws and teeth or poison for self-defence, so do others develop webs or other apparently conscious contrivances to secure their prey. The difference is less in the nature of the act than in the degree of openness or secrecy with which it is performed. In the one case it is indirect, in the other it is direct. A very fine illustration of this view may be added to those which he enumerates, and may, perhaps, better than any other, help our imagination. It is suggested by the coloring of many mollusks. We know that the occupant paints its own shell. It spreads the colors upon parts of its own structure, and these are then applied to the surface of the shell. But though we know this, yet we cannot, in our thought, make much distinction between the nature of the spots on the shell of a mollusk and those on a leopard. Schopenhauer well compares the different classes and operations in a hive of bees to the like division in any one living body. "As the liver," he says, "will do nothing else than secrete gall for the sake of the digestion, and even exists merely for this end, so will the working bee do nothing else than collect honey, secrete wax, and build cells for the brood of the queen; the drones will do nothing else

than fertilize; the queen nothing but lay eggs. All parts thus work merely for the support of the whole, which is the only absolute end; just as is the case in the parts of a bodily organism. . . . This common result the insects *will* without knowing it, just as the organic nature works for final causes. Thus the general choice of means is not left to their intelligence, but only the direct arrangement of them separately. But this is the reason why their actions are in no wise mechanical. The unmechanical nature of their acts is most clearly seen when one puts obstructions in their way. The caterpillar spins itself a nest in leaves, without knowledge of its object, but if one disturbs the web it mends it skilfully." Such repairing of injury and meeting of unforeseen cases, Schopenhauer compares to the *vix medicatrix naturæ*, by which nature repairs the injuries of an organic body; as, for example, she sets a broken bone, forming about the extremities which are to be joined a ring of bone, a sort of natural splint, to keep them in their place until she has united the parts by a more regular process. After this is accomplished, the external ring is absorbed. The fact in organic nature illustrated by the example last used, namely, the absorption, or the expulsion, of what has become useless, this economy of nature, Schopenhauer uses to illustrate the destruction in insect organizations of those members that have become useless for the common end. Thus, when the drones have fulfilled their function they are killed. When the tropical ants in their march come upon a ditch which obstructs their progress, the foremost ones are thrust in till their

dead bodies form a bridge over which the others pass. A similar case is the pulling off of her own wings by the mother ant, when her home duties demand her constant presence. This last is simply the external and indirect accomplishment of what nature often performs in the interior of an organized body. It is like the falling off of the leaves of a flower when they are no longer needed. In the one case nature performs the work indirectly, through instinct; in the other, she performs it directly, without the intervention of instinct. But perhaps we can better understand the manner in which animals make use of means in order to bring about ends of which they know nothing, by reference to the appetites which we share with them. Nothing is more directly adapted to its end than food is to provide for the growth, and supply the waste, of the body. Yet both men and animals eat for the most part as their appetites prompt at the moment, hardly thinking of the object for which the food is taken. Indeed, so far as this object is forgotten, does the food best accomplish its end. It is so most often with the means by which nature renews the human race. In the use of these means, perhaps, their result is oftenest forgotten. Often it is dreaded. Too often it is wilfully brought to naught. By such illustrations we can help our thought to comprehend how it is possible for the lower animals to work with such apparent providence for ends of which they can know nothing.

From the half-conscious working of final causes in instinct, we are now led to consider their utterly unconscious working in organized bodies. Here it

would be impossible to take a step without a continual reference to the final cause. As intellect is by its very nature the acting for an end, so organization is by its very nature the existence for an end. The best definition of an organized body would be, that it is one in which all the parts exist only for the sake of the whole. In the study of nature we are almost startled by the delicate adaptation of means to ends. Perhaps nothing is more striking in this regard than the application of the principle of the pulley to enable a muscle to act in a direction which without this contrivance could not be reached by muscular action. Thus the *obliquus superior* muscle of the eye turns upon itself by a pulley affixed to the frontal bone, and moves the eyeball as no muscle, without this arrangement, could do. This contrivance, if we may so call it, is repeated in the *digastric* muscle of the throat. Further examples, almost equally striking, may be found in the synovial membrane and fluid, by which all friction is taken from the movements of the joints, as we seek to accomplish the same end in our machinery by means of oil. Indeed, we cannot look at any part of any organized body without being struck by its relation to the final cause for which it exists. It has well been said that what the study of simple dynamic causation is in the consideration of inorganic matter, that is the study of final causation in relation to organic nature.

But though we must in general recognize the presence of final causes in the study of vegetable and animal life, the question may arise as to the limit of these causes. While we can hardly be too strict and

confident in seeking to explain by this principle the relations of an organism to itself, we may hesitate and question when we have to consider its relations to other bodies. In other words, as has already been stated, an organization consists in a certain relation between efficient and final causes, and we may well suppose that this relation should be sometimes disturbed, and the efficient causes should sometimes exert their power without regard to the end to be accomplished. We see this in the case of any deformity. A deformity exists when some external cause has forced some part of the organic structure out of its true relations with the rest.

It is an interesting question how far the same irregularity exists in the uniformities of nature. There are general uniformities connecting certain vegetables and animals that are otherwise distinct from one another. One may have certain peculiarities for no other reason, apparently, than because another has them. It is a question which has a very important bearing upon the large theories of physical life, how far such similarities exist for the sake of uniformity of plan, or how far they are simply the result of common efficient causes. In other words, can the principle of final cause be applied to those parts of an organic structure which have no other use than to connect it with other organic structures? One of these uniformities is the presence in all vertebrate mammals of seven, and only seven, cervical vertebræ. No matter how long or how short the neck may be, it may be that of a horse, of a giraffe, or of a hog, its neck contains seven, and only seven bones.

The working of the final cause is well seen in the adaptation of these seven bones to the uses of each animal. We see how well they are fitted, by their shape and arrangement, to enable the giraffe to obtain his food by browsing, and the swan to reach its food beneath the water. The further question is, whether the confining of these bones to the number of seven be also the result of a final cause, namely, to ally the giraffe and the swan thereby to other vertebrate creatures; or whether this number depends upon an efficient cause, that is, exists because the present form of the giraffe and that of the swan have developed from some different forms of animal life which possessed this number of vertebræ. We wonder at the fitness of the proboscis of an elephant to perform its function. Shall we also see in it the working of a final cause whereby it is the analogon of the nose of other animals? Or shall we say it is the analogon of the nose, because it is a transformed and elongated nose? These questions acquire more force when they concern what is useless to an animal, but which seems affixed merely to preserve its relation to a common type. Thus the rudiments of mammæ in male animals subserve no purpose. The question is, whether they are added simply to preserve the unity of type, or whether because the original germ might have assumed the form of either sex, but having been made by circumstances to assume the one, yet preserves the marks and the rudiments of what might have been developed into the full form of the other? Another very striking example is the fact that in the jaw of the embryonic

whale are found the germs of teeth which never become developed, which germs themselves shortly disappear. Can it be that these minute and transient germs are introduced, simply to stamp the embryo as related to other organized bodies, in which such teeth, having a purpose to serve, exist in full and enduring shape? In the human form the useless motor muscles of the ear suggest similar questions. These sometimes movable, yet always needless, appendages are the analogon of muscles in other animals which serve an important use. Can it be that these are simply the artist's stamp on man, to show that the same nature that made them made him also? When analogous forms of organization tend to become actually similar in form or function, the question presses itself more strongly, whether it be not an active cause rather than a final one that was the occasion of the similarity in organizations which had been before so different. Thus it is said that the common snap-dragon and nasturtium tend, under certain circumstances, to revert to the more general type out of which their peculiar shape was formed, or on which it was based. Such reversion — for such we cannot help calling it — points to the fact that the common structure was not only artistically the ideal on which the monstrosities of certain species were based, but was actually the material out of which they were formed.

The fact of the common type which binds all organic forms into one is among the very grandest discoveries and conceptions of modern times. It opens to the student of science one of the most

elevated subjects of investigation and thought, and it has already called out and quickened the genius of some most honored in the scientific world. We take the same kind of delight in tracing the same type through all changes, finding how the strangest and most monstrous peculiarities of species and individuals are only fresh manifestations of this, that we do in following the same theme through all the complicated variations of a grand musical composition, only in this contemplation of nature we have a more sublime result than any single musical work can furnish us, for we have the whole world of inanimate things as the expression of the varied harmony. This observation and this search may be shared in common by those whose explanation of the phenomena is most opposite. The great fact is that genus, species, and individual are never actually one. As we found in speaking of logical propositions that they were always imperfect, that is, that they affirmed the identity of the individual and the universal, which are by their very nature not the same, so we find in the observation of any species or individual an expression of the same imperfection. As the individual has certain peculiarities which the type to which he belongs cannot explain; as the fact that John is man does not explain the color of his hair, or any special modification of shape he may possess; so, on the other hand, the common type shows its presence by marks which do not concern the individual life. The whale would be as much a whale, — that is, would be as well fitted for all the circumstances of its life, — if it had no transient germs of teeth in its upper jaw. The

giraffe would browse as comfortable with twelve as with seven verticle vertebræ; and this comparison could be continued, not only through the examples above given, but through the innumerable others that the study of comparative anatomy furnishes. It is not for logic to determine the cause of this grand similarity and variation. It has only to caution the explorer where the ground becomes uncertain and the support frail. And in obedience to this demand we have to draw the line, in the study of final causes, between the explaining by final causes the relations of the various organs of a body to the perfection and continuance of the whole, and the application of the same principle to the analogons which in one individual, or sex, or species, remind us of others. In the first case, the final cause is as reliable as the force of gravitation in mechanics; in the latter, we are exposed to the misleading of fancy and caprice. Indeed, the explanation of every similarity by unity of plan, and every possible divergence by variation of execution, approaches the viciousness of a logical circle.

But, though it is very unsafe to explain the analogons of the higher with the lower, or of those on the same plane with one another, by the doctrine of final causation, the danger is lessened when we find in the lower the analogon of the higher. Here we cannot fail to detect the influence of the final cause, which, through the lower, is working up towards the higher. The lower is evidently the type of the higher, by whatever power the higher is to be produced. By every theory, whether of development or of progressive creation, the lower must have preceded the higher

in time, and thus the structure of the higher could not have directly caused any peculiarity of the lower, as we might feel at least the possibility of supposing that the higher was directly influenced by the pre-existing lower. It is, then, in tracing the hints and prophecies of the higher in the lower, that we find freer scope for the application of the doctrine of final causes to the general study of organized nature. The most universal of such facts is the adaptation of the type of the lowest organism to take on the highest and most perfect forms. The mere fact, that the highest organic forms are constructed on the same plan that runs through the lower, does not, as we have seen, justify us in explaining this resemblance by the doctrine of final causes. It is at least theoretically possible that the lower, pre-existing, were the efficient cause of this similarity in the higher; and the question, which explanation shall be adopted, can only be solved by the most careful and prolonged scientific study, if indeed it is ever fully settled; but when we find the lower taking on so readily and so perfectly higher and ever higher perfection, we feel authorized in affirming some previous adaptation to this change. We may illustrate this by an example about which there is no difference of opinion. We should not explain by final cause the fact that the divisions of any fruit correspond to those of the flower, or that the structure of the flower suggests that of the leaf; while we should explain by final cause the adaptation of the earlier forms to put on the peculiarities of the later. It cannot be by chance that, in the long run, in the geologic history of the world, the changes of organization have been, on the whole, in the direc-

tion of greater perfection. The formation of organs, and the complication of powers, imply the previous adaptation to assume these organs and powers. As in casting dice, if certain numbers should appear constantly more often than their proper average, however slight this excess might be, we should say that it is not by chance, but that the dice were loaded; so when we see every convulsion of the earth, whether slow or sudden, through the entire reach of geologic history, resulting, on the whole, in more and more perfect forms, we have to admit that this cannot be by chance, but that nature herself plays with loaded dice. And if we go back behind the existence of organic forms, if we survey the scattered particles of the nebulous matter out of which the worlds were shaped, and then see this, as it becomes more and more compact, assuming organic, animal, intellectual, and spiritual forms, we must, at the very least, assume some special adaptation for this result. To explain it by chance would be millions and millions of times more absurd than to explain by chance the fact that the confused contents of a box which contains a boy's dissected map or picture, the longer they are worked over by a person of any skill, fit together more and more perfectly, until at last they form a symmetrical whole, or than it would be to explain by chance the production of a bird from an egg. And in such cases we have no intermediate term between chances and final causes. We may, indeed, very properly adopt Herbert Spencer's ingenious generalization, and explain the course of development by the fact that every cause multiplies effects, while, on the other hand, effects tend to become definite and

regular. This furnishes a superficial explanation for the phenomena under consideration; but it no more fully accounts for them than it would account for the harmony which results from the playing of a band of music, to say that the difference of tones is caused by the fact that each plays on a separate instrument, and the harmony of them by the fact that musical waves tend to assume regular pulsations. All this is true. The slight discords of music become lost at a distance because the irregular pulsations are absorbed into the regular; but this would not take us a step towards explaining the magnificent music of a trained band. The instruments must have been adapted and used for this special end. So the striking and valuable generalization of Spencer, just referred to, does not take us a step towards explaining the grand process of the world's development. You may take a stone and pound it and grind it, and heat it and cool it; you may apply whatever forces you will to it, and each of these forces may multiply its effects *ad infinitum*, but you can never thereby get a bit of moss out of it. For a regular process of organic growth is needed material specially adapted for this. The sun, and the air, and the earth together, bring out buds and leaves and blossoms upon the rose-bush, — *because it is a rose-bush.* Let the theory of development be perfected as it will, and it becomes more and more evident that there must have been an impulse at the beginning towards precisely this result, — an adaptation for which we have no other, and could have no simpler, word than to name it teleological, or, what is the same thing, to ascribe it to final causation.

This result becomes more obvious when we consider the fact that ma , who is the conclusion of the animal series, is also e completion and fulfilment of it. The animal form capable of a symmetry and a beauty, of a blending c the most perfect unity with the greatest variety, vhich it does not accomplish except in man. Other arrangements of the organic structure would have served as well the purposes of the lower animals, but not those of man. It could not be by chance that the animal form should assume a certain perfection in the higher quadrupeds, and then, losing this among the quadrumana, should assume a still more perfect one in man. This is impossible on any basis of chance, because the actual close of the series of animal life might have taken myriads of forms. That it should take precisely the form which is the most perfect that the given bones and muscles could by any guess or calculation reach, must be because this was precisely the result for which they were fitted, and to which they were tending. Indeed, as we look back upon the different forms of animal life, and compare them with man, we seem to see a process of masquerading, which at last comes to an end. It was the human form that was contorted and distorted in all these lower shapes. It was this that swam with the fish, that crept with the beast, that cut all comical grimaces with the monkey, and that finally sprang erect and well proportioned in man. All that was needed was a little straightening here, and pushing back there, to make the human form out of the beastly. Indeed, after such a view as this, one can no more doubt that man is the teleological, or organic

close of the animal creation, than that he is the actual close, and thus the final cause, of the various embryonic changes that precede his independent personal existence.

It has been said that there is in all this no possible term between chances and final causes. Chance is the relation of the results of independent causes to one another. Final causation is the working together of forces specially adapted to a common end. No expression can occupy a middle position between these; and a slight mathematical calculation will show the possibility or the impossibility of chance in the results above named. Take all the forces that are active on the earth, on the one side, with all their possible relations and complications; and, on the other, take the regular course of organic life, general and special, its, on the whole, regular improvement, according to any theory, whether of development or creation, and its absolutely symmetrical close, and it will be seen that the efficient causes, though they often have their free and unfettered sweep, yet, on the whole, were guided and controlled by a final cause. This shows the sense in which man may be spoken of as the final cause of creation. "We see not all things put under him," but we do see him the organic completion of all the perfection of organic life upon the earth.

It was stated above that logic has not to decide between the development theory and that of special creation; yet in what has been said the development theory may seem to have been sometimes assumed. This has been done for two reasons. The first is,

that under the creative theory it was useless to discuss the existence of final causes. The theory assumes them. It was important to show that the development theory is also necessarily bound to them. The second reason is because the terms of the development theory are better adapted to scientific use. Science abhors a break. It is, in fact, her destruction; and the theory of special creation implies a succession of breaks, of those leaps, which, according to science, nature never makes. Thus, whatever be the issue of this controversy, science must long continue to speak and think under the forms of the development theory. The defenders of this theory themselves admit the improbability of its ever meeting with inductive proof. What we know absolutely is, that efficient causes and final causes have been working together; the difficulty is to form a conception of the method of their connection. Either dilemma is sufficiently difficult to conceive. Herbert Spencer pertinently asks whether the believer in special creation can imagine any way in which this could have taken place; whether, for instance, creatures were made in the air and then put upon the earth, or whether they were made in the earth and struggled out, as Milton pictures the half-formed lion. "The belief in special creation of separate classes of living things," he says, "could not exist, if men would try to look at the matter specially and in detail, in the way above suggested." But, on the other hand, Herbert Spencer, in the first number of his "First Principles," has shown the impossibility of conceiving of a self-developing world, and the objections there urged would apply

to the conception of such self-development at every stage of its process. It is impossible to imagine the lowest plant developing itself, without germ, in a sphere that has but recently been a mass of fire. And it is equally impossible to imagine that lowly plant becoming, by any process of self-development alone, an elephant or a man. If the development theory is in any sense true, the earth itself must have been a seed, germinant with all the forms of life that were to spring from it, and specially adapted for their production; and this is the same as to say that final causes have at every step presided over efficient causes. From the position of its defenders, such as Lyell and Huxley, we may take it for granted, as was intimated above, that it will be long at least before this theory of development can be by strict induction proved, or disproved. Yet its language must, as was stated above, be long, if not always, the language of science, for it is her business to explain all phenomena, so far as possible, by their efficient causes; and even if the doctrine of special creation be true, the different orders of organic life, being created according to one plan, must stand in relations which can be expressed most satisfactorily in the language of this theory. There has been an ideal if not a real development. But, on the other hand, religion can still, and must still, use the language of the theory of special creation. It is her concern to emphasize the final cause; and man is no less a creation if made out of the ape, or the ape if made out of a palm-tree, than if each had been made out of the dust of the earth, just as it would require the same creative ge-

nius to make a magnificent statue out of a piece of marble, which had been already cut into some inferior form, as to make one out of a block fresh from the quarry.

From what has been said, it will be seen that efficient, or dynamic, and final causes are not at variance, but only represent different sides of the same event. If it be admitted that the final cause has for its constant companion the efficient cause, and, on the other hand, that the efficient cause is on the whole guided by the final cause, then there can be no possible strife between science on the one side, and theology upon the other. Each, it is true, will use its special language, yet each will continually adopt more and more of the material of the other into itself. Science will make the final cause more and more the object of its induction, as the development theory already in substance does; while theology will find more and more material for wonder and admiration, as it sees how the final cause continually uses the efficient causes, that seem acting with independent freedom, for its own end.

From the above, it will be seen that final causes rest upon an induction as rigid as the other results of science, only such induction must always remain in a certain sense general, never descending to the minute specifications that characterize the induction of merely dynamic causes. The canon for such organic induction, or the induction of final causes, is, that when various distinct efficient causes unite repeatedly in any one harmonious and perfect result, this must be held to be their final cause, and the greater the variety

of these forces and the greater the frequency of their harmonious result, the more perfect is the induction. We have already applied this canon in substance to the organic structure of the world. We can apply it also to other relations. Thus, for example, in a former part of this work, we found that beauty is the free manifestation, or the ideal manifestation, of any and all of the forms of nature or life; that is, whether it be sound, or color, or form, or life, when it freely manifests itself according to its own laws and its own nature, we receive from it the peculiar form of enjoyment that we call the perception of beauty. Now, if all these forms of nature when they reach their perfection are beautiful, what is deformed or unsightly being only the checking, or the restraining, or the interference with the laws of any one of these forms, then beauty is one of the final causes in the existence of each one of these elements. On the other hand, the presence of the unsightly and the deformed would not, in itself, imply any final cause, however much they may be multiplied. For disturbance and interference may be over and over again the result of chance, while a repeated and complicated harmony cannot be.

The same induction may be applied to the history of man. Indeed, such application is only a continuance of the process commenced already in the study of the creation of organic forms. Whatever harmonious result is produced more and more completely by all the changes and convulsions of history, that we may set down to be one of the final causes of history. If, for instance, the rights and the power of the people

have, on the whole, and in the long run, been more and more established by the revolutions and convulsions of history, we may assume these to be one of the final causes and ends of history.

CONCLUSION OF INDUCTION.

We have thus passed over the various forms of inductive reasoning, namely, static, dynamic, and organic; the dynamic including under itself the empirical and the rational. It is evident that our reasoning in common life can, by the nature of things, rarely reach scientific certainty. Neither is such certainty necessary for belief. Of all our knowledge, comparatively little rests upon a perfectly scientific basis, yet it is none the less knowledge. Even in cases at law, the strictness of scientific proof is in general unattainable, the jury having only to make up their minds to the result, so far that they have not a reasonable doubt of its truth. While, if the case be a criminal one, even this degree of certainty is only required for conviction. Yet, in all these cases, the method of reasoning is the same that has been indicated in the methods above described. The difference arises from the fact that, in common life, there may not be material for a rigorous induction, or that it is not considered worth while to pursue the process to its completion, and thus it is allowed, after a few steps, to make a leap to the result. Just when the point may be considered as reached, from which this leap may be made with sufficient confidence for practical purposes, cannot of

course be arbitrarily defined. It will vary with different minds. The weak or untrained will either assume the result almost at the first step, while the strong or disciplined will, according to their strength or discipline, have almost an intuitive perception of the line where conjecture becomes practical certainty, and will keep back its assent till that point is reached; or else the former class will be unaffected by proof to which the second will give absolute confidence. The difference is, in a word, that the one class know neither when to believe or when to disbelieve, while the second has almost an instinctive perception of the points at which possibility becomes probability, and at which probability becomes certainty. One very important element, perhaps the most important element, in this determination is what has been called the inductive weight of evidence.* By this is meant the manner in which any proof affects us, so far as this depends upon our experience of the facts or laws in the department from which the proof is taken. For instance, what a man tells us incidentally, and without reference to his own interest, we take for granted to be true, so far as the matter could have come within the range of his knowledge. What a man tells us for the sake of benefiting himself, we subject to a further process of proof. The old fable of the spelling-books, entitled "The Unjust Judge," could be better used as an example of this logical fact than for the moral which is usually attached to it. A lawyer will be contented in the street with a simple answer to a simple question. In the court room he would subject the same state-

* See "N. A. Review" for October, 1864, p. 600.

ment, if made from a "witness stand," to a severe and searching examination. He knows he is less likely to be deceived in the one case than in the other. So a single experiment in one department of science may satisfy one who is an adept in this science, simply because he knows what is the common relation of such experiments to the truth. For this reason, when the proofs of scientific facts are laid before us, we have often to trust to the scientific estimate of them, rather than to our own, simply because we are not used to weighing that sort of proof. This, for instance, is the reason why the great arguments of geology have had but little effect upon the general thoughts and beliefs of men.

It will thus be seen that the point where any process of induction may be left incomplete, while we accept at once the full result, cannot be laid down with any abstract and *a priori* definiteness. It is a sort of instinct, or intuition, which is the result of one's general habits of thought and of one's experience in the field under consideration. The methods, however, are, in all cases, whether complete or incomplete, whether popular or scientific, the same, and thus the study of the nature and laws of induction, in connection with the practical experience of their use, furnishes the only possible preparation for this purpose.

THIRD FORM OF SYLLOGISM.

IDENTIFICATION.

In the often-repeated syllogism, "All men are mortal; John is man, therefore John is mortal," as we have already seen, each proposition rests upon a dis-

tinct syllogistic basis. The conclusion rests upon the syllogism of the first form which was just given. The major premise rests upon a syllogism of the second form, which we have just studied under the name of induction. The minor premise rests upon a syllogism of the third form, which we have now to consider. In the syllogism of the first form the individual and the universal are united by means of the particular. In that of the second the particular is united to the universal by means of the individual. Because John is man, we know that he is mortal, and man we know is mortal, because all individuals whose lives have reached a certain term, or if prolonged would have reached it, have been mortal. The third point is, how do we know that John is man? To answer this question we consider the general qualities which pertain to humanity, and inquire whether this individual possesses them or not. In other words, in the third form of the syllogism the individual is united to the particular by means of the universal. Its symbol will therefore be,

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That this result may be reached it is necessary, first, to know what qualities do belong to the particular class of objects under consideration, and, secondly, to determine which of these are *essential*, and which can be omitted without destroying the claim of the individual to be ranked in this particular class; or how many of them may be omitted, and how many must be retained for this end. In scientific classification it is a convenience which is always

sought, to have some particular mark by which every class of bodies may be recognized. Thus in zoölogy the structure of the teeth or the claws sometimes furnishes such tests. In botany, — at least in the artificial system, — the number of stamens and pistils furnishes like convenient methods of distinction. Yet such arbitrary marks go but a little way. All other parts of an animal or plant belong also to its generic or specific nature. One skilled will rest as much upon one part as upon another. In fact, our recognition depends in general upon groups of peculiarities of which only a part is always present. Few objects fully conform to their scientific description. One may study in books generic and specific differences all his life, and yet be puzzled to recognize an object belonging to the genera and species with which he has been busied. Any one may, for instance, study the classification of clouds, even by the aid of plates. He may be fluent with cirrus and cumulus, cirro-cumulus and the rest, yet when he begins to study the heavens he finds that the clouds do not put on the fixed forms he had expected. He finds himself in a maze of bewilderment. But after his sight has been familiarized, and he has been taught to distinguish the ideal from among all its actual variations, he recognizes each type of cloud with half a glance. This is also very well illustrated in the experience of the medical student. He studies his books, and listens to his lectures, is ready at examinations, and thinks himself familiar with all forms of disease. In his imagination he administers ideal remedies to ideal diseases with marvellous success. But he finds, on

his first experience, that his patients will not be sick quite in the regular way, or that what looked so clear on paper is not quite so obvious in the sick-chamber. A student reported to the physician with whom he was pursuing his profession that he had met a strange case, which completely puzzled him. His account did not convey much to the doctor, who started with him to visit this wonderful case. Before they were fairly in the room the doctor nudged his student and whispered "small-pox." The student was astonished at this, which seemed almost supernatural insight, and afterwards asked the physician how he could tell without a glance the nature of the disease. "It was the smell," said the doctor; the smell, — that was something that neither book nor lecturer could describe. Thus it is that the physician learns to judge by look, by touch, by expression, by indications almost innumerable, the nature and the event of any disease. He would often be puzzled to explain to another how it is done. An expression of the face is not to be described. When he is puzzled he indeed recalls the descriptions in his books, he studies and investigates. He seeks the marks of this disease and of that, and his special, and as we may call them artificial, tests are available, because he is familiar with the various aspects of disease; that is, because he is at home in the world of which they treat. This example from the medical profession illustrates what is true of all professions and studies. Henry Ward Beecher relates that he once inquired the name of a plant. The person of whom he made the inquiry thought he was feigning ignorance, and exclaimed,

"Why, I first became familiar with that plant through what you wrote about it." — "True," said Beecher, "I wrote about it, but had never seen it." He was familiar with it in books, but did not for that reason recognize it when he saw it. The practical farmer does well to use books; the mere "book-farmer" will fail. In morals it is one thing to paint evil in the abstract, and another to recognize it when it is really present in some unexpected form. Who could tell even how he recognizes a friend in the street. It is not by this or that. It is a glance at the *tout ensemble* which decides. Books of particular sciences or studies give, as far as possible, tests of identification in their several departments. A work of logic cannot give any abstract or summary of these. It can only say that for recognition is needed, for the most part, experience. Thus logic has gone as far as it is possible for it to go. With the first two syllogisms it may be all-sufficient. With his two premises the thinker may sit in his study and draw a conclusion by logical laws in regard to matters of which he has otherwise no knowledge. The statistician may, by means of collated facts, reach, through the method of the syllogism of the second form, accurate results in regard to matters utterly foreign to him. But for *recognition* of real objects according to the syllogism of the third form, logic can help the student little. She can only lead him back to the real life from which she at first called him, and bid him train his senses, and accustom himself to the most minute familiarity with the objects he would study. The

science of logical forms thus reaches its own self-appointed conclusion.

It may be further remarked that the propriety of the present arrangement of syllogisms, by which the second and third have changed places, here becomes obvious. The first form is that of abstract deduction. The second is that of comparison. The scattered objects of the world are taken in all their diversity, and arranged over against each other. The third brings us to concrete individuality, and thus appropriately forms the climax and the close of the series. Moreover in the third form deduction and induction are combined in equal proportions. The observer reasons down from pre-established data, and up from the peculiarities of the object before him. He neither expects to add to his general knowledge, nor to discover any new fact or property in regard to this object. He simply asks, Is this what I have seen described? or, Does this possess the marks which are those set down to such a species or genus? The attempt is merely to make the two cover each other. Thus, as was just remarked, deduction and induction are in absolute equilibrium. This illustrates afresh the concreteness of the third form of syllogism, which thus reconciles and combines the two others. Thus, from a new point of view, we see that its true position is at the close of the series.

CONCLUSION OF SYLLOGISMS.

From the point of view which we have now reached, we can look back upon the three forms of the syllogism taken as a whole, and see the truth of

what was stated at the beginning of our study of them, namely, that these three forms exhaust the possible relations of thought, and make a complete and organic whole. We saw at first that the universal, the particular, and the individual could be related to one another only in the three ways which are expressed by these syllogisms. We have seen that these three forms of thought, deduction, induction, and identification, are the only ones possible to us. Further we have seen that these are needed, each by the other. No one of them can stand alone. That is a poor deduction, which can verify itself by no induction; that is a poor induction that cannot by any deduction find itself connected with some known law or principle; which, in other words, cannot justify itself by an *a priori* argument, as well as prove itself by *a posteriori* evidence; while that deduction and induction are both practically barren and vague, which are not united by identification to the objects of which they treat. Thus, by the method of division and organization, the syllogism becomes instead of an abstract, arbitrary, and formless thing, standing outside of our actual thought and experience, the simple, universal, and beautifully organic form which our thought assumes by its own nature.

CONCLUSION OF LOGICAL FORMS.

We have thus passed in review all the forms of thought. We have been rather witnesses of a process of vital development, than imposers of outward and arbitrary rules. We have seen the two elements, which in the term exist in simple unity, sep-

arate from each other, and stand over against one another in the proposition, and finally, in the syllogism, become united by the mediation of an intermediate element common to both, and thus form a union, organic and concrete, instead of the simple and abstract one with which we started. We have seen, further, the syllogism itself pass from the form of deduction, which, abstract at starting, becomes through its inevitable antinomies, more and more so the longer it is followed, to that of induction, where we have the scattered materials to be collected and compared, and finally reach its natural conclusion in that of identification, where we have the most concrete individuality. We have now to see, so far as it is possible at a hasty glance, the relation which this world of thought stands in to the world of things. This is an important question, for on it depends the answer to another question, namely, whether our reasoning is merely a process which whirls itself on in the brain without reference or relation to other things, or whether it is the very essence and abstract of the world. All that we shall have space to do here, is to point out by a few illustrations the fact, that the relations of thought, which we have been considering, are the same as those which exist in the world itself.

We need not go back to the fact that the relations of universal, particular, and individual were at first developed and abstracted from the relations of the objects about us. We have now to ask how the logical formularies which we have passed under review correspond to these objective relations. It need

hardly be remarked that this discussion cannot be understood or appreciated, except by those to whom the results of the examination we have just compared are familiar.

And first, the term with its elements, one the universal and the other the particularizing or the individualizing one, is the expression of all objective life. Every object consists of these two elements. Further, as the accent, or emphasis, of logical terms represents the negative element, by which all other and more general application of the word is excluded, and it is by this manifestation of force shut up to its special and narrow significance; so does the same force represent the negative energy by which each individual affirms its own separate nature by repelling all foreign and encroaching influences. Thus this stress of accent symbolizes all the violence of the world, that struggle for existence which is the universal tragedy of life. This is no more marked in vegetable life than it is in the simple and uncompounded term, but becomes prominent in the animal and moral creation as it does in the compound term. The strife of animal with animal, of man with man, of nation with nation, is simply the rightful or wrongful, natural or unnatural, affirmation of itself by each. The plant affirms itself, indeed; but simply by the fact of its own existence. It does not by violence repel aggression or maintain itself. It is an unaccented individuality, like that of the uncompounded and original term.

As the term with its two elements corresponds to the objects about us, each taken as complete, so the

proposition corresponds to the great process of growth and development. In the proposition the individual and the universal are visibly brought together; so, in the process of growth and development, an object assumes qualities that belong to it, though it had not before possessed them. Thus, it is the nature of the rose to bear flowers, though in the early season, and in the early period of its existence, it has none. In the process of its growth it becomes clothed with the beauty that belongs to it. And further, as the logical proposition involves a certain inconsistency, because the individual is not the universal, and never can be in spite of its affirmation, so all growth is the expression of this same inconsistency. The thing is not actually what it is by nature and destiny. Its growth is the striving to fulfil its nature, to become one with itself, to make the individual harmonize with the universal. But it can never become absolutely the universal. The genus is perfectly represented in all its fulness and variety neither by the species nor the individual. Thus it gives way and perishes, while the genus embodies itself in new forms. In history we have at all points this same inconsistency, which is the power of its progress. History, in its broadest sense, is the striving though constantly with only partial success to express the infinite in the terms of the finite. Philosophy and theology consciously strive to do this, while institutions and earnest individual life are less consciously attempting the same reconciliation. Thus the ideal proposition, or, in other words, the abstract formula of the logical proposition, namely, the individual is the

universal, corresponds to this universal fact in the outward world.

The mediation between these terms which the syllogism accomplishes is no less truly the representative of the organic life of the world. To say that a tree grows according to the law of the syllogism would seem at first glance utterly absurd. Yet it is none the less true that the threefold relation of universal, particular, and individual, which constitutes the essential nature of the syllogism, is embodied in all organic life. Thus, take for example a tree, and, in whatever aspect we consider it, we find this to be true. Thus we may consider the root and trunk as the universal, since all spring from them. The parting branches form the particular, — the separate leaves, the individual, — elements of it. Now, each of these may be in turn regarded as the middle term by which the two others are bound together. The branches evidently connect the leaves with the root. Yet the leaves just as much connect the root with the branches, for, if they were constantly stripped off, the vital connection between branch and root would cease, and the tree would die. At the same time, the root also binds leaves and branches together. Cut off the root, and the leaves will fall of themselves. Thus, as in the syllogism, each becomes in turn the mean by which the others are connected, and only when each fulfils this function is the work complete. We may take another view, and consider the seed as the abstract universal, containing the possibility of all that the tree is to become. The opening cotyledons, the constantly parting branches, may represent the particular, while

the plant itself, in its organic unity, is the concrete individual. Here, also, each only exists through the medium of the other. The plant may be regarded as existing by means of the branches and leaves. They, on the other hand, exist only in and through the plant; and both reach their united growth only through the seed. Or yet again, we may regard the plant in its relation to species and genus, and here we should meet the same result. The individual is connected with the genus through the species; yet, without the individual, genus and species would perish together; and, further, species and individuals both exist in and through the genus. These examples may show how the syllogistic forms are the abstract of all organic relation.

We may illustrate this in a broader manner, by reference to the large theories of growth and progress already spoken of in this work, as found in the works of two writers who stand in a sort of polar antagonism to each other, namely, Hegel, and Herbert Spencer. The formula according to which Hegel ranges all progress, whether in thought or life, is based upon the relations which underlie the syllogism. Abstract unity, division, and finally a concrete unity, in which the divided elements find themselves reunited into a fuller and more perfect union, — these are the stages of all organic or historic progress. Herbert Spencer approached the same problem from the opposite direction, namely, from pure induction, and reaches a very similar formula. Progress is from the "homogeneous, through the heterogeneous," while the heterogeneous assume a certain definiteness and

regularity which harmonize and unite them. Thus we have practically the same result reached from these two opposite directions of deduction and induction. Hegel starts from the laws of thought, as embodied in the syllogism. Herbert Spencer starts from the observed facts of life and of history. Each wrought without reference to the other. It was like tunnelling a mountain from different sides. The fact that they meet midway is one of the most remarkable in the history of thought. It shows that the forms of thought and those of the objective world are one, and that thus our logical forms are not arbitrary and artificial, but that we may follow them confidently, knowing they are the same which rule in the universe of things.

THIRD BOOK.

THE PROBLEMS AND LIMITS OF THOUGHT.

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In the first part of this work we considered thought in its abstract relations. In the second, we saw it divide itself into its essential forms. We have now to consider it as a concrete whole, to see the general nature of the problems which it has to solve, the end after which it strives, and the limits within which it is by its nature enclosed. In this investigation, we shall have, of course, often to fall back on what has been already stated; we shall have to bring together what in the earlier part of the work met us in separated elements; and though this part of our study will be pursued so far as possible independently of formal and merely scientific distinctions, yet it will necessarily be based upon these, and its general division will fall in with the division of the different syllogistic forms. In accordance with this necessity, the general questions will divide themselves into the problems of philosophy, of science, and of life.

THE PROBLEMS OF PHILOSOPHY.

A. — SUBJECTIVE AND OBJECTIVE.

The first question that meets the thinker, the first logically though not always the first in time, is, how

to get beyond the limits of himself. He finds that all his sensations, all his perceptions, all his thoughts, are simply various forms of his own consciousness. He sees further that all possible experience and thought are liable to the same fatal limitation. He cannot rest in the idea that all the forms of this crowded and diversified world, all the sublime objects of his contemplation, are merely dreams and fantasies. The great problem, then, is how to pass from the purely subjective to the objective, how to secure a footing in the external world.

In the general introduction of this work it was shown that we cannot help believing in the reality of the external universe, and this necessity was analyzed into its two forms, namely, that of self-preservation and that of the active impulses, the one being negative and the other positive. It was there shown, also, by abstract and general reasoning, that the real *being* outside of us and the thought within us were only the opposite sides of the same thing, that they were at heart identical, and thus that in thought we find the reality we seek. In the course of the work this necessity and this relationship have been followed into a more complete development. We have found that the fundamental truth, which underlies all the activities of the mind beyond that of mere sensation, is the unity and organic completeness of the universe. This, as we saw, though brought into consciousness and confirmed by experience, yet constantly outruns experience, and thus shows that it rests upon a basis which is not that of experience. The simplest form of this is the instinct of generalization. It is the

simple good faith with which we begin our acquaintance with the world, the good faith in which we put confidence in our own instincts. We have here the trunk from which springs that faith in the outward world which we have before seen to be a necessity of our nature. The world within us and the world without us are parts of the same whole, and thus must be related to one another. They must be at heart the same. Thus, by the same principle which gives us authority to make the slightest generalization which goes beyond the enumerated facts, we are authorized to assume that the necessary forms of our thought have some relation, definite and real, to the forms of existence outside of us. Kant adopted the principle directly antagonistic to this. If he found time, or space, or the organized completeness of the world to be a necessary form according to which we could not help thinking, he took it for granted that it could have no objective reality. Or, rather, his *dictum* varies in different departments of his work and subject. Time and space, he judges, *must* be purely subjective. In regard to the objects of the pure reason, such as God and immortality, he judges that we cannot through the reason prove them to be true, though their truth may be reached in other ways. From what has been said, it will be seen that the fact that any form, relation, or object is essential to our thought must be taken as a proof that it has some answering reality in the outer world.

We have now to inquire what is the relation of this reality to our thought, and at what point in our thought we may rest assured of the most complete

certainty in regard to it. There are in this relation of our thought to the outside world two opposite tendencies. As we leave actual sensation we leave one form of certainty, and, if our thought be correct, we approach another. The greatest confidence that there is something external corresponding to our thought exists at the point of perception; yet precisely at this point there is the greatest divergence between the subjective and objective. Redness, blueness, brightness, heat, cold, — these, like pain and pleasure, are sensations of our own. They correspond indeed to something outside of us; that is, there is always the same or a similar cause of each of these sensations, and thus the sensation may be taken as the sign of this reality. But beyond this bare existence we cannot conceive any necessary relation between this external reality and any particular sensation. As, however, we go further from these mere sensations, we reach relations which are larger and more general. We reach abstract forms, pure relations, which can have the same application to things as to thoughts. Thus the further we go from mere sensation, the more confident we may be of the absolute and objective reality of our result, *provided the process be correct.* This provision shows the presence of a danger that increases the further we withdraw ourselves from mere sensation. This danger arises from the possibility of mistake in our reasoning upon our perceptions. This reasoning, of course, will involve the errors of perception and add to these its own. Each step in thought thus is exposed not merely to its own possi-

ble error, but has to bear the burden of all preceding errors. Thus the longer a train of thought is, the more is it exposed to mistake. It is from such reasoning as this, that Herbert Spencer reaches the position which he assumes as an absolute one, namely, that the further we remove from actual perception, the less reliable is our thought. From what was said just above, it will be seen, however, that this assumption is partial, and thus imperfect. To complete it, we have to hold fast to the other truth, namely, that the further we remove from perception, the more do our results, if correct, conform to the objective reality. In other words, the more abstract our thought is, the more does it become a mere form which may be filled at pleasure, either by the material of our subjective sensations, or by that of the objective world. When we cling, then, to sensation and to perception, we have the greatest confidence that there is something external corresponding with our internal state; yet we may then be most confident that this external something is very different from our subjective impression. The more abstract our thought is, the more sure we are that, if correct, it actually corresponds with the reality of the outward world. For instance, the scientific statement of the number and length of the vibrations which are the cause of any particular color corresponds far more to the external reality than the simple sensation of this color.

The great problem of connecting the two worlds, namely, the subjective and objective, resolves itself into this, to give to our abstract thought the same amount

of certainty that belongs to our perception, and even greater than this, for each step should correct the errors of the preceding, while making none itself. This result is only to be reached by long-continued comparison of one with the other, and thus by their mutual correction. Our experience needs to be vast as possible, and our thought, by constant reference to that, needs to be kept within the bounds of truth. The trouble is that philosophers are apt to take their start from some point, real or imaginary, and spin all their thin and shadowy system out of this, never correcting or proving it by reference to perception or intuition. From what has been said, it will be seen that this perfect correspondence between the subjective and the objective worlds is a result which we are continually approaching, but which we can hardly claim to have reached, except in some instances of the most abstract nature. The mathematical formula being purely abstract, we may regard as having real objective significance. The same also is true of the abstract formula of progression, namely, from the homogeneous through the heterogeneous to the concrete and many-sided individual. The first of these, namely, the mathematical, is the abstract reality of the static, the other of the dynamic and organic realms of existence and of thought. The filling out of these abstractions is slowly accomplished by the experience of individuals and generations. Progressive science is continually enlarging the world of our perceptions. Progressive philosophy is striving to embody these in its systems; while these systems are undergoing constant correction through philosophic criticism, and also through

scientific discovery. Thus every age makes its gain, and establishes some relation between the subjective and objective worlds more correct than any that had preceded it, while it leaves also a work measureless in its extent to be performed by those that come after it. Thus this rectification of thought, this making the world of thought conform to that of objective reality, is not a matter to be fixed by any arbitrary law, nor to be accomplished by any separate and special effort. It is the work of ages. Each generation of the past has contributed to it, and every generation of the future will do its part towards its consummation.

We have seen that thought needs the correction of the perception. Before leaving this branch of our subject, we have to inquire how thought, in its turn, can correct the result of the perception, and how the different degrees of thought can and should correct one another. Thought may correct in two ways the sensation. The first is by comparing doubtful with indubitable results, as has been before intimated. But it may also correct it by enlarging its field. The power of sensation is limited. There is much in the world, much physical change in existence, which is not perceptible by any of our senses. Thus, the sense of sight can distinguish pure whiteness and pure blackness, and further can discern no color except red or violet, and those which are intermediate between these. To produce the sensation of redness are needed thirty-seven thousand six hundred and forty undulations of the luminiferous medium to an inch; to produce extreme violet are needed fifty-nine thousand seven hundred and fifty such undulations. Now

it is not probable, or rather it is not possible, that these undulations stop abruptly at these limits. There must, at one end and the other, be those that are longer and those that are shorter. We can obtain *a posteriori* proof of this. The chemical effects of light are produced mainly outside of the solar spectrum, by undulations shorter and more rapid than those which form the color of violet. In other words, we have to lay the substance to be acted upon outside the violet rays, in what is, to our sense, darkness. For instance, a cloth wet in nitrate of silver, in this position becomes black. Thus the understanding enlarges the field of the senses, that is, it corrects their imperfection by revealing to our knowledge what would have been an object of direct perception if our senses were less limited in their range. We can easily conceive that there may be creatures whose eyes are so constituted that they can become affected by colors which to us are invisible. Beyond the red on the one side, and the violet on the other, they can perceive undulations of the luminiferous medium. We cannot see these, yet are sure of their existence. What is true of sight is also true of hearing. In general, no undulation of the atmosphere longer than 34.10 feet, or shorter than 0.13 is perceptible by the sense of hearing, yet we know that these undulations increase in one direction and decrease in another to an indefinite extent. We thus see how the senses are complemented in their own department by the understanding. This limitation of the senses is nothing variable, and nothing which can be overcome. The sense of sight may indeed become strengthened for the beholding of

distant objects, and for the discernment of minute ones. In these two directions there is great variety in the vision of different individuals, and also at different periods of the life of the same individual. But the limitations of color furnish the fixed points within which these changes occur. They are like parallel lines, along which we can see to a greater or less distance, and the objects between which we can discern with more or less minuteness, but which we can never pass. The understanding, to repeat, breaks down these barriers which shut in the senses, while at the same time it brings us more into contact with the outer world than the senses can possibly do. Further than that, the understanding breaks down the separation which the senses establish, as those, for instance, between light, heat, and electricity. It shows them to be correlated forces, or, rather, different forms of the same force. But, on the other hand, the corpuscular theory of light, which so long prevailed in the scientific world, shows the peril there is as we remove from the realm of perception. This theory was the pure creation of the understanding. There was nothing corresponding to it in the sun, nor on the earth. These illustrations may suffice to show the greater accuracy, the wider range, and, at the same time, the greater peril of mistake, that meet us the further we remove from simple perception. If our process is correct, the further we go from the sensible forms of things, the nearer do we approach the reality.

There is the same gain and the same peril as we pass from the understanding to the reason. The understanding and the intuitive reason complement one

another as the perception and the understanding complement each other. The reason, as we have seen, extends the realm of the understanding beyond the objects of its direct examination, changing the sum of observations to a universal induction. On the other hand, the understanding analyzes the objects which the reason reveals. We have the instinct of right and wrong, which is one element of our intuitive reason. The understanding examines the objects of its intuition, and does much to arrange and explain their relations by its theory of utilitarianism. This, which can never be the basis of morals, will always be, to a large extent, the correction, the explanation, and the analysis of morals. If we now compare the reason and the understanding with reference to the help that we derive from them in passing from the subjective to the objective, we are met by precisely the same result that we found before in comparing the perception and the understanding. The understanding stands nearer to simple perception than the intuitive reason. This latter reveals to us philosophic, moral, and æsthetic relations, brings us nearer to the reality of things than the analysis of the understanding. When the moral, the religious, the æsthetic intuitions are true and pure, they bring us nearer to the heart of things than all the formal investigations of the understanding apart from these. As one who discerns the free play of life in any animal organism knows more about its true nature than one who had dissected its organization, but who, if we may make for a moment the extravagant hypothesis, had never seen a living animal, so one who discerns

the moral, spiritual, and æsthetic life and relations of the world has more true knowledge of it than the most scientific mind destitute of these intuitions. Yet, on the other hand, this realm of the intuitive reason is the one most exposed to mistake and extravagance. There is hardly a deformity that might not under some circumstances be regarded as beautiful. There is hardly a crime that has not at some times been regarded as a moral virtue, and hardly a vagary of the imagination that has not been regarded as a philosophic or religious truth. We meet, then, the same twofold tendency as before. The further we go our results have greater worth, yet are more exposed to error. We need, also, a similar safeguard. The intuitions of the reason, philosophic, moral, æsthetic, and religious, need to be continually subjected to the criticisms of the understanding, and the freer and the sharper this criticism is, the better; while, on the other hand, the understanding needs to be quickened and elevated by the reason, and, at the same time, to receive from it fresh material for its elaboration.

We have thus considered the first problem suggested by the relations of the subjective and objective worlds. This problem we may call by distinction the subjective one. That is, we consider the world with reference to our knowledge of it. The second problem that springs from these relations we may call the objective. It considers the first as settled. It regards the subjective and objective worlds as equally real, and equally thrown open to our knowledge. It considers them in their purely objective

relation. The terms of the problem are these: We cannot conceive of the outer world as existing of itself. It exists in our consciousness. We cannot think of it *except as we think of it*, that is, in its relation to thought. By means of our thought we trace it back through the ages of the past. Doing this, we find to our surprise that thought and consciousness are objectively the offspring of this outer world, which exists only in them. This antithesis is sharply put by Schopenhauer, who leaves it where he finds it. It is indeed one of the most striking, startling, and suggestive of all the paradoxes which philosophy and science bring to us. Looking more closely, we separate the problem into its elements, and put it into its simplest form. The one position is that we cannot conceive of subject and object as separate. We cannot think of pure subject or of pure object, because thought is by its very nature the relation of the two. On the other hand, our individual consciousness and that of the race to which we belong was, in the order of time, in some way or other, developed out of the material or objective universe. Thus, so far as we are concerned, there must have been pure object before the subjective element was introduced, while the latter still depends upon the former. The only escape from this antinomy is the assumption of a consciousness above and before ours. There must be an infinite subject in which the objective world exists. Subject and object must thus have been always united. This last assumption will lead us at once to the second grand problem of the reason, namely, that which springs from

the relation of the Infinite and the Finite; but another point in relation to the relation of the subject and object will detain us for a moment. It is this: If the subject and object are considered as opposite sides of the same reality, so that thought and the crass reality of the world are in essence the same, which shall we consider as the foundation and explanation of the other? It is evident that when the same question is looked upon simply in this aspect, the materialist and the idealist have equal right. The materialist can urge that thought is only another form of matter; the idealist that matter is only, at heart, thought; in other words that it is purely ideal. But while both these views have equal right, neither is in fact right. Both are alike wrong. The objective and the subjective world, being opposite sides of the same thing, are not therefore identical. Being opposite sides, they are through this very fact not identical. Water and ice are different forms of the same substance. Shall we say that ice is frozen water, or that water is melted ice? We have the same right to say the one as the other. For convenience' sake, we may say either. Yet neither would be absolutely true. Ice and water are not identical. They are different forms of the same substance, and thus as ice and as water they are utterly different. Such is the relation between the subjective and the objective considered merely in their antagonistic relation to one another. Other considerations may indeed disturb the balance of the two. Whether there be such considerations, and if so what they are, are questions which will meet us under the heading of the third

problem of philosophy, namely, that of the relation of inner and outer. In conclusion, it may be well to repeat the definite results at which we have arrived. The subjective and the objective worlds are different forms of the same reality. The fundamental formulas of both are the same. The objective world is, considered in its whole extent, infinite. The subjective world, considered as existing in the mind of any individual man or generation of men, is finite. The senses are limited in their range. The reason is limited in its apprehension. The understanding has only the material furnished by these to work with, and the infinite relations of this scanty material it can only in part comprehend. Thus, the subjective world — meaning by this the world of our human thought — is always limited. It does not correspond with the objective in its fulness. Yet this limitation is by the processes of thought and experiment always lessening. The subjective is constantly becoming more completely one with the objective, that is, more completely answering to it. Thus we see what are the limits of thought in this direction. At any particular moment thought is limited, but these limits are constantly giving way, and thought is thus a progress into the infinite.

B. — SECOND PROBLEM OF PHILOSOPHY. — THE INFINITE AND THE FINITE.

But when we speak of a progress into the infinite, do we use words without meaning? Is it possible for the finite to comprehend the infinite? and if not, does the word infinite have a meaning? This is the

second question which has been one of the constantly recurring, pressing, and fundamental problems of philosophy. If we cannot conceive of the infinite, then the word infinite has no conceivable meaning. The discussion of this question has, with few exceptions, been confused by foreign elements. The word infinite is as easily defined and as easily understood as any other word. It means *without limit.* The trouble has been, first, that many other considerations have been united with this meaning of the word. The attempt was made not merely to find what the word infinite denoted, but also what it *connoted*, that is, what other notions were inseparable from the word. Further, it has been applied often to what, by the very nature of the case, cannot be infinite. We cannot conceive of an infinite square, any more than we can of a round square. A square must have limits, and these limits cannot be circular; yet it is by such expressions as this that the discussion of this problem has been often confused. Further, by the word *conception* has been understood often an imagination. Men have by the word infinite taken away the limit from the object of their contemplation, and then they have sought to look upon it as a limited something. Because they could not do this, as from the nature of the case might have been foreseen, they have complained of the limitations of our mind. These remarks have not been made for the purpose of prejudging the question, but simply to clear up our notions in regard to it before entering upon the discussion. Leaving now these general and preliminary observations, we will consider the infinite in

the various forms under which the word is used, not seeking to solve all questions that may arise, nor to found or defend any system of philosophy, but simply to determine whether we, as finite, have a right to use the word infinite; in other words, whether the infinite is one extreme of our thought, or the impassable barrier of it. To do this we must go back to the three forms which have so often before been the guide of our thought, and consider the subject under the three relations of static, dynamic, and organic.

a. — STATIC INFINITE.

The first form under which the thought of the infinite presents itself is that of *being*. Infinite being may be thought of in two aspects. The first is, that of the indeterminate; the second, that of the absolute fulness. We see, to take an illustration often used by us, ice, and water, and vapor. We see one passing into the other, and know that they are all the same; that is, that they are different forms of one substance. What this is we cannot conceive. By itself it has no existence. It is always embodied in one of the three forms referred to. All we can say of it is, that it is that which may assume these three forms. Our chemical knowledge indeed enables us to take a step further. We can say that this, whatever it be, is a compound of oxygen and hydrogen. Yet this analysis does not help us in forming a conception of the substance which on the one side consists of these two elements, and on the other assumes these three modes of existence. We can, in fact, form no con

ception of what this is in its indeterminate essence, for a conception, as was seen in the early part of this work, consists in determination or limitation. A conception is a universal, limited. Yet none the less do we know what the words mean, when we say that ice, water, and vapor are different forms of the same substance. Indeed, when we say this, our universal is already limited. It is not absolute indeterminateness, but indeterminateness that is subject to certain definite determinations.

If, now, we turn from these three forms which we have been considering, water, ice, and vapor, to all the many shapes and substances of the universe, it is easy to understand what is meant when it is said that all of these are different forms of the same being, that is, of matter. Of matter by itself we can form no conception, for it is the absolutely undetermined. But of matter existing under innumerable forms we can form a conception, for in each and all of these it is determined, and thus we have the two elements of a conception.

The other form under which we may speak of infinite being is that of fulness. The first is absolutely undetermined and empty. The second is that which contains all the variety of quality and of substance. Here, also, we may help our thought, by taking a familiar illustration. Men often become bewildered by questioning and doubting forms of thought which are used simply, safely, and necessarily in common life, when these are applied to vast and difficult subjects. Of the infinite fulness we have an illustration in light. Light, so far as the various colors are concerned is infinite. Were there nothing but colors in the uni-

verse, light would be the absolutely infinite. As it is, it can be regarded as infinite only when the thought is fixed upon colors alone. Light is not mere indeterminateness in regard to color. The uncolored substance exists in this relation of indeterminateness to color. But light contains all colors in itself. What distinguishes the solar spectrum from light is not so much determinateness as evolution. We can conceive of light, we can conceive of color. We can conceive of light, because it has its peculiar properties; of color, because each color is distinct from the others; but of light, as containing the colors in itself, we cannot conceive. Yet we know that light does thus contain the colors. We can understand the meaning of the words. We can conceive of light as that which may become colors. But we cannot bring the two together into a single conception, because each rests on distinct, sensible impressions. Science may, indeed, give us a scientific conception. It may show us the relations of the different undulations of which light and colors are composed; but this will not help us so far as colors, properly so called, are concerned.

We may now turn from this illustration to that which is the general object of our present thought. We can understand that there should be an infinitude in which all positive qualities are included, as colors are included in light. Though the one is so vast, it is not in its nature different from the other. We cannot, indeed, conceive of these qualities as they exist undivided in this infinite, any more than we can conceive of the colors existing in light; but we can follow with our conception the statement that all these

qualities were evolved from one infinite fulness, as we can that colors are evolved from light. This fulness in itself is, save in this infinite possibility, not different from emptiness. Light itself, absolutely unbroken, is in no sensible way different from darkness. It differs only in its possibility. It strikes an object, and the colors spring into distinct existence, as when the ocean smites a rock it scatters its white spray. This is what Hegel means in the statement with which his philosophy begins, — a statement which has served for matter of ridicule to many who have gone no further, but in which he only takes common ground with almost every metaphysical writer who has attempted to reach this ultimate verge of thought, namely, the statement that being and nothing are one. This is not true, absolutely, he says, for the one is the infinite fulness and the infinite possibility. Pure, absolute, undetermined, undeveloped being is not any *thing*, because every *thing* involves limitation. We say of an object, *It is*. The listener waits to know *what* it is. When we can apply a certain quality to it, then we have a conception. The next question, then, that meets us in regard to static infinity is whether we can conceive of an infinite quality, whether the word infinite quality has any meaning for us.

By recalling what was said in regard to quality, in the first part of this work, it will be seen that the expression infinite quality is a contradiction in terms. A quality beyond a certain point tends to pass into the opposite. This may be illustrated by colors. Light, as was said, is the infinite, so far as colors are

concerned. Each color is by its very nature limited. It stands in a polar relation to other colors, especially to its opposite. When intensified, it tends to drag its other after it, whether subjectively in the eye, or objectively in the outer world. We may speak, to take another example, of infinite hardness. The infinitely hard would be the absolutely impenetrable. It would seem as if we might conceive of this. But in the infinitely hard the attraction of cohesion would have absolute sway. The object, being thus governed by attraction, unlimited by any repulsion, would shrink to a point. Indeed, the indivisible atoms, assumed in some physical systems, represent the only possible conception we can form of the infinitely hard. These are, by their very nature, and by the very definition of infinite hardness, impalpable. Thus the infinitely hard has become by its very nature the perfectly soft.

If we pass from quality to quantity, — the next determination of static existence, — we ask whether we can conceive of infinite quantity. Extensive quantity divides itself into two distinct forms, namely, continuous and discrete. The only form of continuous quantity, in regard to which we could think of using the term infinite, is space.

The questions whether space is infinite or finite, and whether we can conceive of infinite space, are questions that have been the fruitful source of philosophic discussion. Much confusion has been caused by confounding extension with space. Extension, so far as we have any knowledge of it, is made up of discrete quantity. And thus the problems whether

we can conceive of infinite space, and whether we can conceive of infinite extension, are two which require different forms of examination, if not different answers. Space is simply the possibility of infinite extension, or, what is the same thing, the infinite possibility of extension. Space is in itself nothing. If you imagine an object struck out of existence, and nothing to take its place, that nothing would be called space. By the term would be meant the possibility of putting something else there, without displacing anything. Such is the meaning of space as applied to the universe. If that were struck out of existence, nothing would be left. If we suppose the universe to be finite, we say that it exists in infinite space. By this is meant that we can conceive of the universe as being extended indefinitely. There is nothing to limit it; or, in other words, if we should leave the universe, and could live and move in vacuity, nothing would ever limit our flight. This possibility of indefinite extension and indefinite movement is a property of the extended material universe, or of any single object in it. Space itself is thus nothing.

In following the discussions of the philosophers in regard to space, we are reminded of the familiar story of Hans Christian Andersen in regard to the royal robe that was said to be invisible to those unfitted for their office or position. It would seem as if most philosophers fancied they would appear incompetent for their work, if they did not multiply high-sounding words in regard to the magnificent nothing that envelops the universe.

When we turn from space to extension, from con-

tinuous to discrete quantity, we turn from nothing to everything. The question, whether we can conceive of infinite extension, is a question that has at least a meaning. The *possibility* of infinite extension is essential to our very thought of extension. That is, we cannot think of any object, however vast, without seeing the possibility of something existing beyond it, or of its moving in any direction from itself, the lines of direction being taken from its own structure, and not from the nothing called space. Whether extension is at any moment actually infinite, that is, whether the physical universe has absolutely no bounds, is a question that is difficult not merely to decide, but in regard to which it is difficult to determine the *a priori* possibility of solution. Here the scientific theories of the infinite and limited elasticity of matter do not concern us. Far as the farthest star that is visible, matter extends in uninterrupted course, as is shown by this visibility, which could not propagate itself across an absolute vacuum. But leaving these scientific aspects of the case, and looking beyond the farthest discernible limit, it would seem to the mind, at first thought, that a collection of finite particles must be itself finite. We cannot, it would seem, conceive a finished collection of bodies to be absolutely numberless. We can conceive of their being progressively infinite, by means of new creations; but we cannot, it would appear, conceive of their being at any one moment absolutely infinite. But while considering the mental difficulty involved in this conception, we must remember that space itself is made up of infinite points;

that is, there is a possibility of infinite extension, and that it is the possibility that staggers us. We thus see that the difficulty in regard to forming a conception of infinite extension springs from the tendency that we have elsewhere noticed to confound conception with imagination, and that thus the difficulty is imaginary.

Discrete quantity may exist either in succession or in extension. The possibility of successive existence, or change, is called time, as the possibility of extension is called space. As we can conceive that starting from any point, had we power of infinite movement, we could move forever, this conception furnishing our idea of infinite space, so we can imagine that the successive changes which fill up and constitute that which we call time may be continued forever. This possibility of infinite time we call eternity. The common apprehension is, indeed, somewhat different from this. It is fancied that at death, or at the end of the world, time will stop and eternity will begin. But, so long as there are finite beings in existence, so long must their lives be measured by successive periods. When time shall cease, it shall be because all finite being is absorbed and lost in the one infinite. If by eternity we mean the unfulfilled possibility of time, it lies close before us at every step. We are always on the verge of it, but it flies before us. More accurately, eternity is the substance of which time consists. Eternity is the measureless ocean. Time is the ripple running across its surface. We believe in the possibility, and in the reality, of the infinitude of time as it

stretches before us; that is, we believe that this series of finite changes will never reach its end. The finite is always pressing into the infinite, yet never becoming one with it, because it *is* finite and the other is infinite. Eternity is thus always an unfulfilled possibility. Every point reached represents only so much finite time. Every point is a limit, while the possibility which is infinite stretches before.

As we look back and ask whether there is an infinite series behind us, as well as an infinite series before, we are perplexed by new complications. Our first impression is, as it was in regard to space, that there can never be an infinite series completed; that we cannot trace back an infinite succession into the past, because that would involve a complete infinitude in one direction, whereas in finite relations the infinite is only an infinite possibility. Here, however, we are met by a graver difficulty on the other side. We cannot conceive this series to have had a beginning. Every change implies a preceding change. This succession, which we call time, presenting, as it does outwardly, mere static relations, is connected inwardly with dynamic ones. The great law of cause and effect comes into play. There is no beginning of movement without previous movement. Theologians, indeed, are in the habit of stopping short the series with what is called the great first cause. But this does not help the matter. We cannot conceive the Divine Being to have passed an eternity of inaction, and suddenly, without any stimulating cause, to have entered upon the work

of creation. This great first cause, if we may use an expression so liable to misuse, is *first*, not in the order of time nor before the order of time, but as being the one power from which is the energy of all finite force. It is not before, but within and behind, the row of finite succession. And, indeed, could we believe that this finite succession had a sudden beginning, that there was a moment which was the first moment of time, and all that preceded it was eternity, yet this eternity was simply the possibility of time. It was the endless possibility, and the conception of this possibility of time is subject to the same difficulty as that of time without beginning. It is the possibility itself that staggers us.

We have found, then, a difficulty in both directions. We cannot conceive of time without beginning, and we cannot conceive of it with a beginning. Yet it must be one or the other. This antinomy in our thoughts cannot represent an unyielding antagonism in the outward reality. When we look more closely at our difficulty, we find that the word conceive is used in a different sense in the two cases. When we say we cannot conceive of an infinite made up of finite points, we mean that the mind cannot take in the idea. We understand the words, we know what they mean, but we can form no corresponding image in the mind. When we say there cannot be the beginning of finite change, we mean that such a beginning would contradict the fundamental and absolute law of cause and effect, according to which change is always preceded by change. When we have to choose, then, between what would cause a stretch of faculties to

which they are unequal, and that which would involve a contradiction of the fundamental law of thought, we must choose in preference the first. We are driven to admit that time can have had no beginning; and as we were at first thought disposed to deny the infinitude of extension for the same reason that we were tempted to deny that time could have had no beginning, we see from a fresh point of view that there is left us no ground for denying the infinitude of extension, that is, for denying that space may be filled by the material universe; although we are not driven to this by the same necessity that controlled us in regard to time.

b. — DYNAMIC INFINITE.

Having thus considered what we may call the statical infinite, we have now to consider the dynamical infinite. Can we conceive of infinite force, and under what form does such force present itself to the mind? As we look at the universe we find that gravitation may claim to be such a force in a certain direction, as a straight line may be infinite in length, though in other respects infinitesimal. If the material universe be infinite in its extent, gravitation, which is coextensive with this universe, is also so far infinite. Indeed, without regard to the probability of a boundless universe, gravitation would hold together such a universe if it existed. All the worlds, no matter how mighty, no matter if they were numberless, would be controlled by it as easily as the falling apple is drawn by it to the earth. In all thi

measureless burden there would be no strain, no falling off, no stimulus, no unsteadiness. It would follow its own law and neither lag nor hurry. When we look more closely, we find that though the force of gravitation and attraction is infinite so far as extension is concerned, in intensity it is finite. The force of repulsion is its constant and well-matched opponent. They contend together, and the universe, as it exists, is caused by their equilibrium. Besides this, there are other forces which modify the action of these two. Chemical forces readjust their relations. The flash of the electric current overpowers the might of gravitation. The forces of life, in their turn, suspend the action of the chemical forces, although at last they yield to them, while the force of intellect enters as a new element in the grand contest of forces which makes up the life of the worlds. No one of these forces can be pronounced in the strict sense of the word infinite. Modern science opens to us, however, in the doctrine of the correlation of forces, a grand conception. It is that of one common, universal force, of which all these are but the varied forms. Attraction, chemical, vital and intellectual forces are affirmed to be only the varied manifestations of this one. It holds material substances together as attraction. It opposes itself under the form of repulsion, it flashes in the lightning, it burns in the flames, it awakes the vital energies of the world as light, and, in the plant, itself grows and blossoms and bears fruit. Can we form a conception of this force in itself? If we cannot, it is because it has no such independent existence. Its very exist

ence is in these diversified manifestations. In this it is similar to the substance which exists under the different forms of ice, water, and vapor, but which is in itself neither of them. We cannot conceive of it in itself, yet we can understand the truth of the proposition which affirms that these three are only different forms of one substance. So, when we say that this one infinite force exists in all these different forms, we state what is intelligible. It involves no limitation of our understanding that we cannot conceive of it in any separate and independent shape, for as such it does not exist.

We might here rest content, and feel that we had reached the conception of infinite force. We are able, however, to take a step further. The doctrine of universal and endless progress brings us to the thought of a force that is really infinite in the largest and fullest meaning of the word. Progress implies that at every step there is more force than is needed for the existing relations of things. Indeed, all movement implies the same. There is an extra or superfluous power, which, not needed for the existing arrangement, introduces a new. We may illustrate this, by the old experiment of the ivory balls. The force of a blow struck against the first of the series is transmitted to the last. Each of these ivory balls possesses for the moment an extra and superfluous force which passes on to the one next before it. We can attain a more vivid conception of the same thing, if we imagine the balls to be hung at a little distance from one another, say an inch apart. When the first ball is struck it moves an inch.

It possesses, however, more force than is needed to move it this distance. This force is transmitted to the next. This second ball is also moved an inch; but it, also, is the bearer of more force than is needed for this movement, and this extra force is transmitted to the next. The number of balls that could be thus moved, each an inch, will show the amount of force which was for the moment embodied in the first ball. If the series thus moved were infinite, then the first ball, and indeed each ball in its order, was for the moment the bearer of an infinite force. In like manner, if the history of the world or of the universe be an endless progression, an infinite force is involved at every step.

The same fact may be illustrated in a different manner, according to the familiar and plausible theory of Mayer. The heat of the sun, and thus the vitality of all the solar system, is kept up, according to this theory, by the collision of meteoric matter with the sun, as a bit of iron may be kept hot by repeated blows. According to this theory, the material universe is infinite. It is filled with nebulous matter. A current of this is formed towards the sun by the force of its attraction. This nebulous matter becomes condensed as it approaches the solar system, until it hardens into the meteoric substances, the blow of which revives the failing energy of the sun. Thus does the solar system continually derive fresh life from this source. Under one of these two forms must we conceive of the endless progress of the universe. Either an infinite force is embodied at

every stage, or a fresh force is continually being introduced from an infinite fountain.

C. — ORGANIC INFINITE. — THE ABSOLUTE.

We have thus considered the infinite in its static and dynamic relations. We have now to consider the thought of the infinite in the largest and fullest sense of the term, which includes all statical and all dynamical relations, and which, from its including these two elements in one complete whole that is at once infinite in repose and infinite in activity, we may call the organic infinitude. This infinite fulness is what is called the absolute. It is, as has been said, infinite in repose, for there is nothing outward to disturb it, and it suffers neither addition nor diminution. At the same time, it is infinite in activity, for, as we have seen, an infinite force is pervading it at every moment. Thus the body of a sleeping man is, so far as outward bodies are concerned, in repose; yet within, all the vital functions are still active in those processes which, from birth to death, suffer no suspension.

The infinite is often spoken of as existing over against the finite. If this were true of the infinite, in the largest sense of the term, there could be no such thing. If the infinite were over against the finite, there would be two finites. The absolute includes the finite in itself. It includes the infinite power and the finite manifestation of the power. The power without such manifestation would be it-

self powerless. It would have no field, and would thus be limited, that is, finite. The manifestation or the unfolding of all that is involved in this power is finite at every step, and becomes infinite only by means of endless succession. To pass, for the moment, from abstract terms to concrete, the absolute is not God alone, if we can conceive for the moment of a possible divine existence without any objective universe. The absolute includes both God, using the word in its popular significance to signify the abstract divine consciousness, and the universe, the universe being in its endless series of progressive change the manifestation of God. For the complete conception of the absolute, then, it is necessary that the unyielding wall, which is apt to separate in our thought the infinite and finite, should be broken down. We must, to use still concrete language, conceive that God recognizes in the progressive universe the manifestation of himself; while, on the other hand, the universe should come to the consciousness of the Divine or Infinite, as being active within itself. This is done by the spirit in its largest consciousness and its grandest thought. It becomes conscious that it and all things exist only in the divine, and that the divine is the life of whatever has true life. In this large consciousness, which is reached by religion, by philosophy, and by the purest intuition, we have the circle complete. The absolute has reached its true and full reality. It exists not only, to use the language of philosophy, *in itself*, but also *for itself;* that is, each side recognizes itself in the other. At the same time it must

be remembered that the infinite exists in the finite only as an infinite possibility. The rush, the hurry, the unresting succession of the universe, is the struggle to express the infinite in finite factors. Yet as this process is endless, that which is in itself finite becomes thus the manifestation of the infinite.

It we consider what has been said of the infinite, in its relation to the limits of our human thought, the first fact that meets us is, that the definitions of it, that is, the meaning of the words, we can understand. When we say that the absolute is the absolutely infinite, we know what is meant. We cannot indeed take in all the fulness of the absolute, because we are a part of the finite manifestation. But, on the other hand, our limitation is a retreating one. We, also, having an endless progression before us, these limits will retreat endlessly, so that they do not belong to the spirit, but to the moment. We are always overpassing them, and thus they have no permanent reality.

We thus conceive of the absolute as divided. There is the infinite power, and there is the manifestation of it, which is infinite through endless succession. Of the beginning of this division, that is, of the first act of creation, we can have no conception. We cannot get beyond the relation of finite causes, though we know that behind each of these is the infinite cause. We can trace the world back to the nebulous haze, but we still ask whence and how. We cannot conceive of the beginning of the material universe. We can conceive only of an endless process. This does not show the weakness, but the

strength, of our thought. If what has been said is true, the material universe is such a process without beginning and without end. By the material universe, we here understand the universe of finite forms or beings. Behind and within these is the infinite power, which is infinite through this endless manifestation. If we can conceive of neither beginning nor end, it is because there is none. Or rather, since the end is not so much of time as of attainment, it is reached at every step. At every step the infinite and the finite meet. At every step, the infinite recognizes itself in the finite, and the finite recognizes more perfectly the infinite. Thus every step is an attainment. At every step the absolute completes itself.

3. — THIRD PROBLEM OF THE REASON. — INNER AND OUTER.

The mind is not content to know that there is an infinite force in the universe, controlling the changes of the outward world. It demands to know the nature of this force. It is not content with the visible procession of the outward forms of things. It feels that the reality is within and behind these. This manifold and variegated nature seems often only a painted screen, a drop-curtain, which shuts out that which is most worthy of wonder.

"Men ask," says Hegel, in effect, "what is the interior of the universe? what is within?" But he says, This is a question that nature is always an-

swering. The growth, the progress of nature and of history, these are only a turning inside out. There is nothing hidden that is not revealed. There is great truth in this statement. The plant and the flower show the inner nature of the seed or of the bulb. Every stage in nature is the preparation for, and the prophecy of, what is to come after; and that which comes after shows what was hidden within that which went before. Human nature is the fulfilment of the lower natures, and is the heart and kernel of the world; while the latest history is the unfolding of what was hidden in the earlier.

Though this is true, it does not fully meet and satisfy the need and the demand which have just been described. Men feel that there is something within and behind at every step, something which the evolution of nature and history does not exhaust. Schopenhauer affirms a principle in regard to this, which has always been taken for granted, though never so distinctly expressed; and even Schopenhauer himself fails in the carrying out of his principle. The principle of Schopenhauer is this: We demand to know what is the inner nature of the phenomena by which we are surrounded. We cannot get to the heart of them. There is, however, one phenomenon, the interior of which every one can reach and behold. This phenomenon is, for every one, himself. To the outer world, he is a form like other forms, a phenomenon among phenomena. But he, in this single case, is admitted behind the scenes, and knows what is the inner force and nature. What he finds there, in this only opportunity which he has to go behind the forms of nature,

he is justified in using in the explanation of nature. What he finds behind this phenomenon he may assume to be behind all phenomena. It is as we find it in the case of the worlds. We are admitted to see the inner nature and the use of only one, yet we cannot help using what we find in this world for the understanding and explanation of the others. Though Schopenhauer has thus laid down an important principle, he has, as was stated above, failed in his application of it. He states that our consciousness affirms that the inmost core of our nature is the will. The will is the substance within and behind the phenomenon which bears our name. This will he further defines to be the blind impulse of the whole nature, which determines, or rather which *is*, the unchangeable character of each, which controls the intellectual faculties themselves, and to which all conscious motive, and the whole mental organization, are non-essential accidents. This view he has wrought out with an unexampled brilliancy and acuteness. Yet it must be admitted that this blind will of which he speaks is not an object of consciousness. It is not what we find when we look into ourselves. All that we are conscious of is the will acting consciously and according to conscious motives. Will, defined from the consciousness of any individual, would be defined, Force united with conscious motives. Schopenhauer's notion of will, as in itself blind and unconscious, he does not find in his own nature. He finds it in the outer world, and from thence brings it into himself. The real process of his thought was the opposite of what he described. While he claims to be explaining

the outer world from the inner nature of man, he is really explaining the inner nature of man by the outer world. Even when he attempts to prove by brilliant argument that this unconscious will, as a mere blind force, is the inner nature and true being of man, he reasons about this inner nature, instead of telling what it is in his own consciousness. His result is the result of argument, and does not spring from what he sees in his single peep behind the scenes.

The general principle of Schopenhauer is unquestionably true, and it is one on which mankind has always acted, only, instead of this blind force, men have found within themselves a conscious will acting from conscious motive, and it is this that they have applied to the explanation of the outer world. This force indeed is often blind. The motives from which it acts are not always conscious. It sometimes cheats the intellect by feigning unreal motives, as when an angry man persuades himself that in his revenge he is seeking merely the public good, or when it leads one to the verge of some bad action, pretending that it does not mean to commit it, and only at last throws off its disguise, and springs forth to accomplish the act. In spite of all this, we feel that the conscious and self-directing will is the consummation of humanity. The examples, such as have been referred to, are taken from its degradation; and it is this perfection of human nature which is felt to be the key to the mystery of the universe.

This key men in all ages have used instinctively. All science rests upon the assumption of the correspondence between our own nature and that of the

inner life of the universe. It seeks in the world a plan and an order, which shall to us seem orderly and systematic. This search assumes that the power which controls all things adopts an order like that which a perfect mind would adopt. Philosophy more openly assumes the same thing, in that it more consciously applies the forms of human thought to the explanation of the outward world. This same assumption is the starting-point and the life of all religion. The earliest form of religion, Fetichism, took it for granted that behind each of the individual forms of the world was a nature like our nature. The stone, the tree, the animal, were each believed to be animated by a spirit akin to the human spirit. Polytheism gives up no inch of the ground thus covered. It sees behind all the objects of the world a like nature and intelligence, only it puts one such nature behind groups of objects. Monotheism, following the generalizations of science, places one intelligence behind all the manifold shapes of the universe. In the largest and the smallest it sees the traces of this presence. It has receded no step from the position even of Fetichism. Behind every individual object it finds this kindred presence, only there is but one. All nature is aglow from this one light. Fetichism is retained to a very large extent in the most developed thought. In other persons, in animals, we see motives and feelings like those which we ourselves possess. We explain their acts from our consciousness. But beside this, we apply our consciousness to the explanation of the great movements of nature and history. It has been just said that this process is instinctive

It is, also, in the highest sense, rational. It results from the fundamental proposition of the reason, that, namely, which affirms the unity of all things. From this it would result that our nature must correspond with the nature about us.

The question now meets us, When we speak of the inner nature of the universe as kindred to that of ourselves, do the words mean anything? The question of finite and infinite meets us here again, and we must make a definite application of the principles already laid down, uniting the results of that investigation with those of the present. The difficulty is, that we apply terms taken from the affections, that is, from the qualities of our finite natures, to the infinite nature. Qualities, as we have seen, cannot be infinite. They are, by their very nature, finite. Do the words which name them have any meaning when applied to the infinite being? It must here be remembered that the word infinite has a relative use as well as an absolute one. To return to an illustration already repeated, light is infinite in relation to the colors. An endless line is infinite in one direction. So the human mind or soul is infinite as regards its own qualities. More generally, every object is infinite with respect to its qualities, as light is with respect to color. That is, every object is at heart a unit. Every human being is *one*, though his qualities are manifold. This one integral nature exhibits itself to us by means of these manifold qualities. They are not it; they are manifestations of it; they are modes of its existence. The fact that these qualities are partial, imperfect, or few, shows that the

nature is, as regards other natures, itself imperfect and finite. To say that the application of the names of qualities to the one supreme being which we call God is meaningless, because we have no conception of any but finite qualities, shows a confusion of thought. To say that God is a being of infinite qualities is to use words without meaning, because quality is, by its very nature, finite. When we say, however, that God is the being of all perfect qualities, we no longer use words without meaning. We mean that in him are all perfections, all the perfections of the universe. To say that these are finite, is only to say that they are qualities. They are the limitations of his infinite nature for the manifestation of itself, as our qualities are the limitations of our natures in their self-manifestation. A person would meet precisely the same difficulties in explaining how the several qualities of the single nature of any one human being could spring from this one single nature, as to explain the relation of the divine qualities to the infinite divine nature. When you come into contact with any quality of a human being, you have not reached his real and central nature, but have reached within a step of it; that is, you have reached its first manifestation. So, when we meet the divine qualities, we do not meet the absolute nature of God, but its manifestation. We come nearest to this nature when we apply to it that which we can conceive as most perfect. Could the inanimate worlds conceive of God, from their lower degree of relations, they would conceive of him as the infinite force. This conception would be partial, yet true as far as it went. No higher

conception could leave out that of the infinite force. So the plant would, and rightly, conceive of God as the infinite life. That conception would be true, though partial. The spirit conceives of him as the infinite spirit. This is still true, but still partial. What may be above this we do not know, or what further may be involved in the word spirit.

We may look at the same facts from a different stand-point. When we see the regular arrangement of all things in the world, we cannot apply to it any other word than Order. When we see the adaptation of everything to its end, we cannot describe it by any other term so well as by the word Wisdom. When we see the beneficent working of the laws of the world, we can use no other word in regard to their source than Benevolence. In a word, we cannot think of the central and inner power of the universe, save by using forms of thought adapted to express such personal relations. The words thus used have a positive meaning. Moreover, the highest quality that we can conceive, we feel that we predicate most truly of this cause, unknown yet always revealing itself. When, looking on the one side, we find that the highest term that we can use is Love, and on the other, we look at the beneficent working of the forces of the universe, and of the intimate connection of every soul with this hidden cause, so that every life touches it, comes forth from it, and exists in it, we find no word so fitting as the word Love to express the reality of this relationship.

From what has been said, it will be seen that the limit of our thought here is like that in other direc-

tions, a retreating one. As our own interior life becomes perfect, the more insight do we have into the inner life of the universe. The two progressions move side by side.

We have studied the nature of these problems of the reason, in order to discover the limits of human thought. We find that the solution in all cases depends upon the one fundamental proposition of the reason which affirms the unity of the universe; and we find, also, that the limits of human thought are those which spring from its finiteness, but that they are limits which are constantly retreating before the expanding nature of the soul. Thus there is no absolute limitation to thought. Its limits are only those of the moment, which the next moment removes. New limits, it is true, take the place of the old, but these are as transient as the first.

SECOND. — PROBLEMS OF THE UNDERSTANDING OR OF SCIENCE.

The limits of human thought, as it strives to solve the problems of science, offer less to detain us than we found in pursuing like investigations in regard to the problems of the reason or of philosophy. In the case of these latter, the limits in which thought is, or is supposed to be, confined, spring from the nature of thought itself, and thus require consideration in a logical discussion. In the case of science, the limitations are for the most part in the nature or relations of the external world. The one can thus be determined by *a priori* reasoning; the other only by *a*

posteriori. Still, however, a hasty glance at this field is necessary for the completion of our treatment of the subject. We will retain the same division that has so often served us, namely, that of statical, dynamical, and organic relations.

The forms which are assumed by what we may call statical science are twofold. This science may be either historical or analytical. What we call, somewhat loosely, historical science includes the description and classification of all the objects in the universe, present and past, so far as these are accessible to human knowledge. This last provision suggests the external limit of these sciences, although this limit is a variable one, receding before the advance of invention and of research. The invention of the telescope and every improvement in its structure have opened new fields to be occupied by descriptive science. The microscope has done the same, in the opposite direction. Geologic research has made the past also, in a great measure, open to scientific description. In the face of all this advance, it would be folly to attempt to fix any limit to the advance of descriptive science. It would appear to us that the distance of the stars must forever shut them out from the domain of our knowledge; while so far as the past is concerned, it would seem as if the primitive strata, out of which almost every trace of life has been removed by fierce heat, would forever wall up any further progress in that direction. Even the first traces of the history of man would seem to be washed out by the glacial period, as drawings upon a slate are washed out by a wet sponge. Yet we cannot say that these

limits may not be surpassed. We know not what discoveries are before us. So far as the past is concerned, history is still making. Every stage of being may be now existing in the world. The primitive elements are still at work. Continents are still forming. The coral insects are plying their slow but stupendous work. Beasts and savages still roam the earth, and, if no other means are at control, it may be that the present may thus replace and explain the past.

The other element of historical science is, as we have seen, that of classification. Nothing is easier than to classify; nothing is harder than to make one's classification fall in with the plan of nature. The rejoicing of Hugh Miller when he discovered, or supposed that he had discovered, that the divisions and arrangements of geology fit in with the actual divisions in the process of creation, illustrates the kind of triumph that every science must achieve. The superiority of the natural to the artificial system of botany is simply that the former falls in more accurately with the divisions of nature. The artificial system included all in a convenient form, more convenient in some respects than that furnished by the other, yet in entering it we left the world of nature. There is here, also, no limit that can be affixed to scientific progress. There is no reason why it should not continually approach more and more nearly actual identity with nature itself.

The other element of statical science was stated to be analytical. Historical science describes and classifies. Analytical science seeks to reduce the elements

of nature to the smallest possible number. Unity is the end of all science. The problem of analytical science is to reduce the fundamental elements of all bodies as nearly as possible to unity. How nearly this can be accomplished cannot of course be even guessed at. The question, however, may be raised as to whether there is any *a priori* possibility of reaching the complete result aimed at, that is, of determining whether from one simple substance all others could be by any possibility derived. It would seem, at first sight, as if this were absolutely impossible; as if there must be at least two primary substances in order that the first compound could be formed. The late discoveries in regard to the colloid condition of matter show, however, that it is dangerous to dogmatize in this direction. We see a simple substance, or what appears to us to be such, existing under two utterly unlike forms. The conjecture may thus be ventured whether it may not possibly be found that one simple substance might exist, the arrangement of the particles of which might be capable of assuming two forms so distinct that the two might enter into combination with each other. This suggestion is not put forward as a theory, but only to show the danger of attempting to limit the progress of science by any *a priori* theories. The fact that some binary compounds result from a twofold composition of their elements, as if, for instance, the symbol for water should be, as some maintain, H^2 O^2 instead of H O, may illustrate the possibility in the direction pointed out.

The example taken from the colloid condition of

matter does not, it is obvious, fairly apply. Should the ultimate elements of matter ever be reduced to one, it will be shown that these bodies which assume two forms are not simple, but themselves compound. What we call the colloid would be the allotropic condition of matter. But the fact of the recognition of this colloid state by science shows that the most opposite conditions of an absolutely simple substance are not inconceivable.

It is, however, in dynamical relations that science finds its truest and highest work, and it is here that the problem of science meets us in its sharpest outline. The work of dynamical science is to study the relations of cause and effect. It traces backward and forward in endless succession the lines of causation. Behind every effect is a cause, but this cause is itself an effect with a cause standing behind it; while every effect is also a cause producing other effects. These lines, then, are interminable. The grand problem of science is to make these lines converge and unite in one. Each science is complete so far as it brings its various forces under some common law and into some common relation. Science, in general, is complete so far as it unites all these separate systems into one common system, these separate forces into one common force. Towards this latter result the present generation has taken a tremendous stride. The discovery of the great principle of the correlation of forces equals, if it does not surpass, in importance and grandeur any other discovery that ennobles the history of science. The discovery of the law of gravitation showed the identity in the forces at work

in this world and throughout the whole reach of the starry universe. The discovery of the identity of the lightning with the electricity of the laboratory was another step in the invasion of the mysteries of the heavens. These are, above all others, startling to the imagination. But the discovery of the principle by which all the forces active about us are shown to be only various forms of one force is recognized by the understanding as a grander victory, inasmuch as the differences of kind which are united by this principle are more radical and essential than those of space to which the former discoveries referred. The principle of unity, the revelation of which is the great problem of science, seems to have been thus reached in one direction. The application of this discovery has, however, limits beyond which it cannot pass. The nature and fundamental qualities of matter in general, and of all its various forms in particular, lie outside of the succession of cause and effect. These are permanent, and the special results of causation depend upon these. Why, for instance, a certain physical arrangement produces within the eye the sensation of blue, why one body is an acid and another an alkali, and why the two are so drawn together,— all of these questions relate to the inner world, which our laws of causation cannot reach, and across which the series of causes and effects play, as the ripples or the waves follow each other across the ocean. Our laws of causation, then, are external and superficial.

Further, there is a force at work in the universe which can never be brought into any system of correlation, or into any system of mere science. This

is the force which is behind and working through the progressive history of the world. Progress is the law of life and the law of history. It rests like the law of gravitation on a basis of strict induction, and like that holds itself aloof from our scientific generalizations. As the principle of gravitation cannot as yet be brought to take its place among the correlated forces which form the brilliant system above referred to, so the principle of progress works through and by the means of these other forces, yet will not count itself among them. Indeed, the problem of science is to exclude as far as possible this principle of progress, and reduce all change to the relation of equivalents. Herbert Spencer has gone further than any other in this direction; but yet what he has done shows most clearly the impossibility of completing the undertaking. Science must move in the direction towards which he points; but the simplest phenomenon of organic growth, in which the law of growth overrules and uses other force, is forever inexplicable on any principle of equivalents; and this is a type of the progress in history and in the geologic ages, in which all special forces are the instruments of one overruling tendency. The theory of development and that of special creation are alike in this. As above stated, there is an infinite force working through, and in, nature and life. It is concealed like the ictus of the ivory balls, but reveals itself by results which cannot be accounted for by any arrangement of previous circumstances. This infinite force will forever escape our scientific formulas. These have to do with equations and equivalents; *that* is out of proportion with

all other agencies. These others are but the conditions. This works through them and springs from them.

If, after these observations, we take a hasty glance at the relation of science to the grand organization which we call the universe, we meet the same relations as in the case of philosophy. There is the same advance, the same surpassing of limits, and the same stretching before, of what can never be fully gone over. Is science limited or not? At every step it is limited, yet these limitations are constantly giving way. The old limits pass, but new spring to fill their place. At every step there is victory. At every step the circle is complete. Yet at every step new obstacles challenge the advance, and a broader circle stretches beyond, to be clasped by the unwearied and unfolding reach of thought.

THIRD. — PROBLEMS OF LIFE.

What thought strives to comprehend, that life has to realize in a concrete form. Life, like philosophy and science, is progressive. Its problem is one that will never be so completely solved that its work will be accomplished. We meet the same two factors as before, the infinite and the finite. The struggle of life is to unite the two, to embody the infinite in finite forms. This is a problem which demands the united strength of the reason and the understanding. Here, also, victories are continually won; but other victories yet more brilliant always remain to be achieved.

The static problem of life, that is, how to embody life in enduring forms, is the one which from the

nature of the case is more insoluble than any other. It is so in regard to public affairs, because the movement of history is onward, and thus what seems stationary is only a temporary stage. The only permanent political forms or institutions are those which allow for this expansion, which admit of change without suffering thereby destruction. In regard to the individual, the static problem is no less impossible of solution. Here there is progress; but the progress is followed by decay. So far as the outward is concerned, it is a rise and a fall with no pausing place.

The dynamical problem is how to make the most of the vital force in the individual and in society. How to make the most of himself is the problem that meets every one. The answer varies in detail with regard to different individuals. It involves all questions of physical training and mental and moral education, and also of the personal government and the aims of life. In general it may be said, however, that to make the most of one's self, one should fall in with the grand movement of life and of history. By moving on the line with this, one has his puny efforts seconded by the infinite force, as when one sails down stream the force of the current itself bears him on. So far as society is concerned, it may be also remarked in general, that it is essential to this end that the development of the individual should be left free and unrepressed, and provided with what is essential for its start in the great movement. A glance at the great organic relations of society and of history shows us that this progressive movement is for the world at large inevitable. We speak of the logic of events.

This is the necessity that there is for one event to follow another. It makes no difference when or where a universal idea is given to the world, sooner or later some one will trace it to its particular and individual results; as, on the other hand, all particular and individual facts will at some time find their generalization. The individual as we see him in this world is not long enough subjected to this logic of events to secure inevitably this result. On the contrary, too many depart, the lesson of life unlearned. But the state sooner or later feels its full force.

The static and dynamic problems of life, which admit of no satisfactory solution when viewed in their separateness, thus meet us united in organic relations, and here first may be properly understood and answered. This is seen in the case of the individual, first, by the fact that it is the final cause of any life, that is, the purpose for which one lives and the strength of this purpose, that determines its success or failure, and not any outward accomplishment or lack of accomplishment; and, secondly, that the individual life, as was intimated above, does not reach its full development when pursued merely as an individual life. It receives its complete strength only as a part of the great social organism to which it properly belongs. In this the partialness of each is complemented by that of others, and the imperfect success of each is made complete by the common triumph of all. And in the case of the state, the static problem is solved only by an organism that admits of growth and progress, by providing for, and adapting itself to, these necessary changes. When this is accomplished it need not

timidly repress any of the forces of the life which it contains. On the contrary, it reaches its true end only when it develops and utilizes all these forces; and falls short of this only when through ignorance or the repression of outward circumstances any part of its mass fails to partake of the common life.

These problems of life, at which we have thus glanced, do not, however, properly belong to our subject; and for this reason they have been passed over so hastily. They adjoin it, they spring out of it, they form the transition between it and the outward world. They form the doorway through which, after having passed through the world of pure thought, and studied it in its manifold yet simple relations, we pass out into the concrete world of facts and tangible forms, bearing with us the result of our sojourn in the realm of pure thought, to be our help and our guide.

NOTE TO "PROPOSITIONS OF PERCEPTION."

(See Page 110.)

I did not realize the full treatment which the "propositions of perception" required, until it was too late to introduce this into the body of the work. I there analyzed the outward senses upon which these propositions rest for their truth, but neglected to refer to the inward senses, which are hardly less important for this purpose. The recognition of any object or fact in the outer world is no more an act of simple perception than the recognition of any internal thought or feeling. The logical importance of this internal perception may be seen in the *Cogito* of Descartes; and also in the controversy, that has sprung up of late years, in regard to the true method of the study of psychology.

APPENDIX.

APPENDIX.

I. THE PROPOSITION.

In the text it is stated that in all logical propositions the predicate is regarded as more extensive than the subject. This is in accordance with the position of Hegel, who makes a distinction between a logical proposition and a simple statement of fact, or, as we should say, an individual proposition. I am inclined to think that this difference does not exist, and that in all propositions the subject is brought into relation with a class which includes other members besides itself. Take as an example of an individual proposition the following: Philip was the father of Alexander. Both Philip and Alexander are individuals. Each is the centre of a group of characteristics and relations; and it is possible that the two groups are equal in extent. In the proposition before us, however, Philip is considered as an individual, and as such is brought into relation with Alexander. He takes his place in the sphere which is made up of the relations and things that may be called Alexandrine. Or we may take a different view. The question may have been whether Philip were or were not childless. In this case, the proposition plases him in the general relation of fatherhood. It does not affect the result that these two universals, things Alexandrine and fatherhood, meet in a single person and indicate precisely the individual Philip. In

real thinking our interest would be actually in one or the other of these universals. It would probably be in the enlargement of our thought of Philip through his subsumption under the things Alexandrine. The proposition may be reversed. We may say Alexander was the son of Philip. Such a change cannot, however, take place without a change in the aspect of the thought. Alexander is now subsumed under things Philipine. It is the constant change of interest and emphasis that makes to a large extent the charm of even our most superficial thinking. It is a clumsy handling of such delicate relations when we use the term Identical Proposition or Individual Propositions in such a way as to leave no place for this fine play of the changeful life of thought.

No treatment could be clumsier in this respect than the attempt to reduce every proposition to an equation. This method, as applied by Jevons, may be a matter of practical convenience, but it is wholly contrary to the nature of thought. It introduces a tautology which has no place in real thinking, and it makes of this artificial tautology the essential thing. We do not care to know, for instance, that John is a John Englishman; we wish to know simply his nationality. We do not care to know that monkeys are monkeys quadrumana; our interest is only to know that they are quadrumana.

II. THE SYLLOGISM.

Mr. F. H. Bradley, in his important and interesting work, "The Principles of Logic," argues with great force against the importance which logicians have been in the habit of giving to the syllogism. In view of this discussion, and of the general tendency to underrate this form of reasoning, it may be well to suggest certain considera-

tions in regard to it additional to those embodied in the text. The significance of the syllogism consists in the fact that nothing can be affirmed in any particular case which cannot be affirmed with truth in regard to all similar cases. If an individual or a particular statement is made, the test of its truth is found in the question as to whether the statement is capable of a universal application. A consideration of the extent of its general truth furnishes the measure of its probable truth in this particular case. The universal may stand to the particular or the individual statement in either of two relations. It may be external or accidental, in the sense that we know only by the results of an examination that the proposition is generally true. The thought of a man would not suggest the idea of his mortality, unless, by experience and by the study of the past, we had learned to associate the idea of mortality with that of man. When we have thoroughly learned this, then the syllogistic form has become useless and is cast aside, except as it may be needed to teach some one who has not learned the lesson. The other form of the relation of the general truth to the particular statement is what we may call that of inherence. It is seen intuitively as soon as the particular statement is made. When we say, If A is west of B, and B is west of C, then A is west of B, we see at the first glance that this is true. We do not separate in our thought the general truth that underlies the statement from the special application of it. This is what is called direct inference. The elements of the syllogism are there, but they have flowed together into an undivided, though not an indivisible unity. The syllogistic process begins and ends with such direct inference. The major and the minor premises involve such an inference and so does the conclusion. These direct inferences are

either of the originally intuitive form, or they represent some permanent result of previous thought or experience. The syllogism is thus implicit in all reasoning, although it is not necessary to make it explicit except in cases where there is some doubt as to the proof of a proposition.

A GARLAND fresh with flowers of song
Would be an offering more meet
For thine acceptance than these sheaves
Of ripened, dry and heavy wheat,
Which, bringing from the harvest field,
I lay, belovéd, at thy feet.

I will not try with useless words
To glorify this gift of mine.
It were a hopeless task to prove
The homely offering fit or fine.
The truth is simply told: these sheaves
Are all I have; I make them thine.

But when I sought the harvest field,
Thy careful love went forth with me,
Supplied the strength I lacked, and wrought,
Through the long hours, ungrudgingly;
Even this poor gift I cannot give;
I bring but what belongs to thee.

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